THE IRON AGE

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Steel Trade Expects Much of 1926

A Remarkable Output in 1925, but Competition Was Active and Prices Suffered—A 22 Per Cent Greater Year Than 1924, but with Similar Production Cycle

CONDITIONS within and without the industry point to continued large-scale activity in steel well into 1926. To other evidences of sustained consumption has been added a convincing one in the high rate at which buyers have been taking shipments in December, a time when stocking is avoided.

A Bright Outlook

The steel trade knows that some of the cautions sounded in the past week in business forecasts are quite in order, but in the main it finds the tangible factors in the situation fully as promising as those of a year ago. If it should turn out that the great wave of new construction loses some of its crest in the next twelve months, though all signs are that it will still run high, there is compensation in the railroad demand that of late has been above the average of the past five years. Track replacement will be on an unusual scale in 1926. Automobile companies now expect to equal their remarkable volume of 1925 car building. These three lines—transportation, construction and automobiles—took between 55 and 60 per cent of the steel shipped from the mills last year.

Large-Scale Consumption

The high hopes entertained of last year as it opened were realized in large part, so far as volume of business went. But it was evident early in the year that some of the predictions made just after the election of 1924 were beyond the mark, particularly an intimation that the steel companies would have more orders than they could take care of; but even so, consumption in some lines was on a greater scale than in any preceding year.

Two influences had much to do in determining the year's results for the producers of steel. One was that all the steel companies had been doing much to make their plants highly efficient, while individually they seemed not to appreciate the extent to which the rest of the industry had been doing the selfsame thing. The result was that, though some of the leading producers did a larger business than ever, each had a sense of getting less than its fair share.

Then there was the effect of the persistent policy of short-term buying which consumers had carried over from the preceding year. As had been seen in 1924, the absence of good backlogs from the books of the mills led them to underestimate the extent of the demand and therefore to be keener in the pursuit of tonnage, generally at the expense of prices.

Production Cycle Repeated

The parallel between the production curves of 1925 and 1924 was striking. At the opening of each year production of steel was on the up-grade; in each, the peak was reached in March, followed by a four months' decline to a

1925 in Steel

TO the surprise of the industry, 1925 made a new record in steel ingot output, the total being about 44,000,000 gross tons, or 7,200,000 tons more than in 1924. The previous high mark was 43,619,000 tons in 1917.

The year's business ran over 20 per cent more than in 1924. In production 1925 was an 82 per cent year, while 1924 averaged 67 per cent.

Consumers were often in the market and did little forward buying. Having small backlogs, the mills were keen to get tonnage, often at the expense of prices.

Steel works operations ran nearly the same cycle as in 1924—a high rate in the first three months, which proved to be overproduction (though to a less degree than in 1924), a gradual decline to the year's minimum in July, a slight pick-up in August, some gain in September, and in the last three months a close approach to a record rate.

Prices were highest as 1925 opened. THE IRON AGE composite (seven leading finished products) was 2.560c. per lb. early in January. Low point was 2.396c. in late August and early September. At the year-end the figure was 2.453c. or about $2 a ton less than in January.

It was a poor year in merchant pig iron. Volume was greater, but prices lower than in 1924. Total pig iron output, about 36,750,000 tons; in 1924 it was 31,405,000 tons.

minimum in July; then a steady up-climb to the end of the year. In 1924, December showed a considerable increase over November; at this writing it is not certain that last month exceeded November in like degree. In 1923 there was a strong upswing in the first three months, like that of 1924 and 1925, but the downswing lasted longer, continuing into December, while the rebound was delayed until January, 1924.

This repeated cyclical movement has attracted no little attention from both producers and consumers, and the curves depicting it have well nigh acquired a standing with buyers along with those curves which represent the price changes over the same period, a factor in the determination of the times and quantities of their purchases.

Channels of Consumption

On other pages is a detailed analysis, illuminated in a pictorial way, of figures sent to THE IRON AGE by steel producers, representing the various outlets for rolled steel in 1925. At best these figures are estimates, for the steel companies themselves are often in ignorance of the line of manufacture in which their shipments will finally go. But different years show differing rates of steel absorption, even in the main lines of consumption.

In the tonnage it brought to the mills construction work made a new record in 1925, and that was well, seeing that railroad buying was not so large, in relation to output, as in some other years. Fabricated structural steel contracts have made successive records in the past three years—2,185,000 net tons in 1923, 2,363,500 tons in 1924, and roundly 2,600,000 tons in 1925.

The common impression of railroad consumption of steel last year was probably an underestimate, being based largely on the lessened scale of orders for cars and locomotives. Track work exceeded that of 1924, being fairly comparable with the volume of 1923. In the latter year production of standard section rails was 2,630,000 tons, while the estimates given THE IRON AGE by producers indicate 2,595,000 tons for 1925. On car steel the mills did better last year than would appear from the reports of new car orders. While the latter totaled 78,000 (apart from those placed by roads with their own shops), as against 135,000 ordered in 1924, the car works actually built and delivered 94,000 cars last year, or only 10,000 less than in 1924.

Automobile consumption of steel made a new record last year, steel company estimates indicating 4,300,000 tons.

Both for new oil and gas wells and for pipe lines, particularly the latter, there was a good demand upon the mills, the Houston Oil Co.'s 200-mile gas line engaging Steel Corporation capacity in the larger sizes for several months. It was a record year in gas line pipe, other contracts being for 150 miles, 127 miles, 120 miles, 75 miles, 60 miles, 35 miles and 25 miles.

Offsetting the short fruit and vegetable crop of 1924, the canning industry had its record year in 1925. The tin plate output was the country's highest, being estimated at 38,000,000 to 39,000,000 boxes, or 11 to 12 per cent above the previous high record.

Sheet consumption also was notably large, for automobile and other uses. As one example, steel barrel production in the first six months was 35 per cent more than in the first half of 1924.

Farm equipment plants were busier than in any year since 1920, operations running up to 75 and 80 per cent of capacity.

Fluctuations in Output

As in 1924, the high point in production last year was reached in March, when steel ingot output was at the rate of 50,000,000 tons a year. The low month was July, with a yearly rate of 36,500,000 tons. Thus the swing was from 68 per cent of capacity in the latter month up to 93 per cent in March.

The year's steel ingot output may be estimated at 44,000,000 tons and that of steel castings at 1,250,000 tons (against 1,120,782 tons in 1924), making the total of steel ingots and castings about 45,350,000 tons, compared with 37,931,939 tons in 1924. The high record was 45,060,607 tons in 1916.

In the table below are given the production of pig iron and of steel ingots, also the total of ingots and castings, in the high war years and the years following:

	Pig Iron, Gross Tons	Steel Ingots, Gross Tons	Steel Ingots and Castings, Gross Tons
1916.....	39,434,797	41,401,917	42,773,680
1917.....	38,621,216	43,619,200	45,060,607
1918.....	39,054,644	43,051,022	44,462,432
1919.....	31,015,364	33,694,795	34,671,232
1920.....	36,925,987	40,881,392	42,132,934
1921.....	16,688,126	19,224,084	19,783,797
1922.....	27,219,904	34,568,418	35,602,926
1923.....	40,361,146	43,485,665	44,943,696
1924.....	31,405,790	36,811,157	37,931,939
1925.....	36,750,000*	44,000,000*	45,250,000*

*Estimated.

We estimate pig iron production for 1925 (including charcoal iron, of which statistics are not collected monthly) at 36,750,000 tons, against 31,405,000 tons in 1924, an increase of about 5,350,000 tons. As showing the fluctuations in output we have prepared the table below, giving the number and capacity of furnaces in blast at the beginning of each month. The largest number was 254 on March 1, with a daily capacity of 115,700 tons, and the smallest, 189, on July 1, with a daily capacity of 86,250 tons. Thus the range was from an annual rate of 41,200,000 tons at high, down to an annual rate of 31,500,000 tons:

1924	No. in Blast	Daily Capacity, Gross Tons	1924	No. in Blast	Daily Capacity, Gross Tons
Jan. 1....	228	98,380	July 1....	189	86,250
Feb. 1....	251	111,150	Aug. 1....	190	86,420
March 1....	254	115,700	Sept. 1....	192	88,250
April 1....	245	112,380	Oct. 1....	200	92,050
May 1....	220	100,800	Nov. 1....	206	97,950
June 1....	196	89,550	Dec. 1....	220	103,800

The variations in the average daily rate of steel ingot production, month by month in 1925, as shown by the statistics of the American Iron and Steel Institute, were as follows:

Months, 1925	Daily Production, Gross Tons	Months, 1925	Daily Production, Gross Tons
January	155,502	July	118,753
February	156,510	August	131,694
March	161,482	September	134,342
April	137,982	October	144,186
May	133,010	November	156,294
June	123,348	December	.....

Price Changes Were Many

Last year's fluctuations in market prices kept sellers and buyers continually on the *qui vive*. The price curves and tables on other pages give a picture of this phase of the market. They show that while some products had considerably wider price swings than others, broadly speaking the highest prices of the year were in January; then came six or seven months of decline, a steadier market in early fall, and in the last three months firmness and moderate advances.

JANUARY ADVANCES DID NOT HOLD

In analyzing what happened, steel makers admit that production was pushed too hard in the early months of the year, when consumption had not had time to get the expected post-election stride. The price advances of $2 a ton on plates, shapes, bars, wire and some other products, which were announced in January proved to be a mistake, chiefly because their purpose was seen to be stimulation of specifications against lower-priced business taken late in 1924. Buyers had their doubts. It would seem that steel consumers better appreciated than did producers the new ability of

the steel industry to produce, and of the railroads to transport the product speedily; also that they put their observations to good use.

SHEETS CONSPICUOUSLY WEAK

As prices gave way, manufacturers decided that only by full operation could they reach costs low enough to meet the situation. Thus overproduction was accentuated. Sheet manufacturers were conspicuous for trying to get 100 per cent operation on a 75 or 80 per cent market. This demoralization in sheet prices extended over a considerable part of the year. As high as 3.60c. and as low as 3c. was done on No. 28 black sheets, representing a swing of $12 per net ton, or more than on any other product. With no less than 36 companies producing sheets, a highly competitive condition is the normal state of the industry.

Plates and wire products were second only to sheets in their exhibitions of weakness. Plates sold in the East as low as 1.55c., Pittsburgh, and 1.90c. was the high point. Bars made the best showing among heavy products. For ordinary lots 2c., Pittsburgh, was maintained most of the year; but large buyers did not pay more than 1.90c., and in general that was minimum, apart from a few automobile company contracts.

Apart from rails, on which the $43 price was maintained for all the year, pipe and tin plate had the best record for price stability. In the latter there were the usual concessions from the $5.50 season price, and the largest buyers had a $2 per ton preferential.

PIG IRON AND STEEL PRICES MOVE IN PARALLEL

As shown on the accompanying chart on which THE IRON AGE composite prices are plotted, pig iron and finished steel moved during 1925 in lines more nearly parallel than has been the case in a number of years. Each reached its maximum for the year in January; each receded gradually but consistently to a minimum in mid-summer; each recovered slowly but steadily from that time until the close of the year; each ended the year at a level not far from that of April and about 4 per cent below the high of January; each held its year-end figure unchanged for several weeks through December.

Pig iron last year receded from its maximum of $22.50 to a minimum of $18.96, a drop of 15.7 per cent. Meanwhile finished steel declined from its maximum of 2.560c. per lb. to a minimum of 2.396c., a fall of only 6.4 per cent, or two-fifths as much as for pig iron.

Moreover, the pig iron drop took place in 19 weeks, while the much smaller decline in finished steel occupied 29 weeks. The average rate of declination was 0.83 per cent per week in pig iron and 0.22 per cent in finished steel. Strikingly similar were the figures for the recovery. Pig iron came back 13.6 per cent in 17 weeks, or an average of 0.80 per cent per week. Finished steel rose 2.4 per cent in 11 weeks, or an average of 0.22 per cent per week.

Finished steel ended the year 4.2 per cent below its maximum level, recorded in January. Pig iron ended the year 4.3 per cent below its maximum level, also recorded in January.

Pig iron maintained in 1925 the lowest average level in ten years. Only fractionally below 1924, it was well under the "panic" years 1921 and 1922—10 per cent below their average, in fact. Finished steel, while 10 per cent above the depressed prices of 1922, was, with that sole exception, at the lowest level since 1915. Steel was about 33 per cent below 1920; pig iron prices averaged less than half those of 1920.

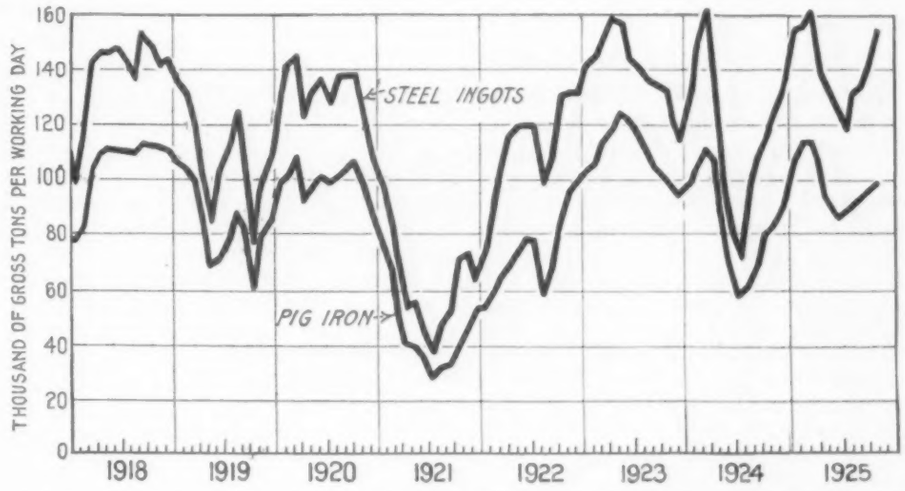
Exports Less, Imports More

At intervals in 1925 attention has been directed to the fact that our exports of iron and steel have been decreasing, while our imports have been increasing. It is true that the tendency in our exports is downward, but it is not markedly so. Taking the past four years in pairs, the yearly average of our exports in 1922 and 1923 was about 1,990,000 tons (the totals for the two years being almost the same), while for 1924 and 1925 the average has been about 1,785,000 tons—roundly a 10 per cent falling off.

The import increase has been considerably more in tonnage and in percentage than the export decrease; but the imports of finished steel by no means bore out some of the prophecies made early in 1925 as to the great inroads French, Belgian and German steel were going to make in this market.

As in other years, Canada was the largest buyer of steel from the United States, nearly 40 per cent of the total going across the border. Japan has ranked second for a good many years as a customer of our steel companies, but last year our shipments to Japan fell off in a marked degree. In the six years following the war Japan took, on the average, nearly 27 per cent of our iron and steel exports. Last year the percentage was about 12. Japan was a large user of American sheets, but is now prepared to roll in her own mills the greater part of her sheet consumption. Recent reports that Japan will buy rails in Europe to replace American rails in track in Japan were without foundation, but the fact is that Japan has been in the past year a considerably smaller buyer from American steel mills than before.

Our exports of semi-finished steel in the first 11



FLUCTUATIONS in Daily Average Production of Steel Ingots and of Pig Iron During the Past Eight Years Show Considerable Parallelism. Monthly ingot figures of the American Iron and Steel Institute and pig iron figures of THE IRON AGE tell the story

months of last year were 96,000 tons, against 107,000 tons in the same period of 1924; of steel bars, 102,000 tons, against 92,000 tons; galvanized sheets, 148,000 tons against 100,000 tons; tin and terne plates, 148,384 tons, against 148,428 tons; rails, 147,000 tons against 185,000 tons; pipe and fittings, 221,000 tons against 197,000 tons.

Our machinery exports for the year are estimated at $377,000,000, against $325,000,000 in 1924.

The table below gives by months the 1925 exports of iron and steel products reported in tons, and similar figures for five previous years:

Exports of Iron and Steel, Gross Tons

	1920	1921	1922	1923	1924	1925
Jan.	333,601	547,394	160,920	123,190	247,942	140,802
Feb.	308,185	393,328	133,975	133,902	164,820	101,665
Mar.	417,216	230,635	208,843	163,920	123,618	154,178
Apr.	395,120	162,592	198,830	177,471	131,276	154,426
May	420,359	142,551	230,062	203,389	154,136	150,612
June	402,707	119,081	212,295	171,183	163,770	136,847
July	458,866	86,523	157,169	168,558	137,481	138,670
Aug.	431,484	75,827	145,640	161,426	134,628	188,963
Sept.	409,200	95,169	129,475	172,499	135,979	136,754
Oct.	452,015	106,582	132,924	152,511	157,071	141,817
Nov.	434,297	122,290	127,782	186,956	123,577	171,134
Dec.	498,765	134,415	150,170	177,844	128,865	.....
	4,961,815	2,213,042	1,988,085	1,992,849	1,803,163	1,770,000*

*Estimated.

IMPORTS OF ROLLED STEEL MADE A GAIN

For the 11 months ending with November we brought in 845,000 tons of iron and steel products, against 487,000 tons in the first 11 months of 1924. The pig iron increase over 1924 was more than 200,000 tons—388,000 tons against 181,000 tons. The total of finished and semi-finished steel brought in in the 11 months was 292,000 tons; in the same period in 1924 it was 201,000 tons. Cast iron pipe included in the "tubular products" item was 44,000 tons in 1925 to Nov. 30, and 46,000 tons in 1924. Thus the semi-finished and finished steel total for 1925 to Nov. 30 was 248,000 tons, and to the same date in 1924, 155,000. Here is a 93,000-ton increase in imported steel over 1924.

Throughout the year there has been a steady filtering of foreign steel—largely French, German and Belgian—into Atlantic seaboard, Gulf and Pacific ports. Structural shapes were the largest item—73,495 tons to Nov. 30. Bars were next, at 52,307. Rails and splice bars were 36,600 tons. These foreign rolled products were generally sold at prices ranging from $8 to $12 a ton below those of domestic steel. All told, the past year's imports of foreign steel were less than 1 per cent of the domestic steel production.

Unsatisfactory Earnings

Despite a volume of business which might have been expected to lead to a fair return, profits of steel companies in 1925 left considerable to be desired.

Earnings of the United States Steel Corporation for the first nine months of the year were practically the same as for the corresponding period in 1924, notwithstanding the increase in business done. However, with indications of increased tonnage and some stiffening of prices, earnings for the fourth quarter should bring the year's total above the level of the previous twelvemonth. Earnings for the last three years by quarters were as follows:

Quarters	1925	1924	1923
First	$39,882,992	$50,075,445	$34,780,069
Second	40,624,221	41,381,039	47,858,181
Third	42,400,412	30,718,415	47,053,680
Fourth	.....	30,762,231	49,958,980

The amount available for addition to surplus after payment of dividends in the first quarter of 1925 was $6,005,079; for the second quarter, $6,688,792, and for the third quarter, $8,604,611.

Earnings of the Bethlehem Steel Corporation for the first three quarters of 1925 were approximately $4,000,000 in excess of the figure for the corresponding period in 1924—$28,445,606 against $24,445,774. Nearly half of this increase was made in the third quarter when earnings of $8,377,762 were $1,842,031 above those for the third quarter in 1924.

The Republic Iron & Steel Co. earned approximately $1,000,000 more for the first nine months of 1925 than for the first three quarters of the preceding year: $4,628,857 against $3,566,291. Practically all of this increase may be traced to third quarter operations, when earnings totaled $1,555,755 as compared with $460,656 for the same period in 1924. Additions to surplus were almost $1,000,000 more for the first nine months of the last year than for the same months of 1924.

In the first three quarters of 1925 the Inland Steel Co. earned $3,448,619 as compared with $4,599,748 in the first nine months of 1924. The falling off was in the early part of the year, however, and the upward trend of the company's earnings is evidenced by a third quarter total of $1,189,235 as against $931,384 for the third quarter, 1924.

The Youngstown Sheet & Tube Co. during the first nine months of 1925 earned $10,419,897 as compared with slightly more than $6,000,000 for the same months in 1924. The third quarter of last year showed up very well with a total of $3,299,436 as against the poor third quarter of the previous year, which amounted to but $472,899.

A Trying Year in Pig Iron

Pig iron production in 1925 exceeded that of any year since the war excepting 1923. Estimating December output at somewhat more than 3,250,000 tons, the total for the year is roughly 36,750,000 tons. The record production of 1923 was 40,361,146 tons.

The outstanding characteristic of last year's market was the low level of prices. The year's average, as shown by THE IRON AGE composite figure, was $20.58, which is 32c. less than the average in 1924, when production was 5,350,000 tons below the 1925 total. The average price of iron for the six years from 1919 to 1924 inclusive was $27.60, which is more than $7 a ton above the 1925 average.

IMPORTS OVER 400,000 TONS

The merchant furnace situation has been particularly acute on the Atlantic seaboard, where heavy importations of European and Indian iron in the past year have meant the loss of considerable business to American pig iron producers. The year's imports were well in excess of 400,000 tons. Most of this came in at Atlantic ports, but on account of high rail freight rates did not penetrate far into the interior.

It cannot be said, however, that importations were solely responsible for the low selling prices on pig iron. At Pittsburgh, Cleveland, Chicago and other interior points, where foreign iron is not a factor, the market was on low levels. One explanation is that buyers maintained an unruffled and at times skeptical attitude regarding prices. There was no hectic buying. Even the anthracite coal strike and the resultant demand and high prices for coke did not cause consumers to overreach themselves. There was extensive covering of requirements during the autumn coke flurry, but the rise in prices in the last three months of the year was only $2.53 per ton over the September average, and some of this increase can be attributed to the normal enlargement of consumption in the fourth quarter.

STEEL COMPANIES SOLD 1,500,000 TONS OF PIG IRON

Another explanation for the low prices of the year is that steel companies were at times aggressive sellers of iron. The increase in by-product coke production, necessitating larger outlets for coke, kept active more iron-making capacity at steel plants than was at all times warranted by the demand for steel. Thus, as in recent years, a good deal of steel company pig iron found its way into the open market. The

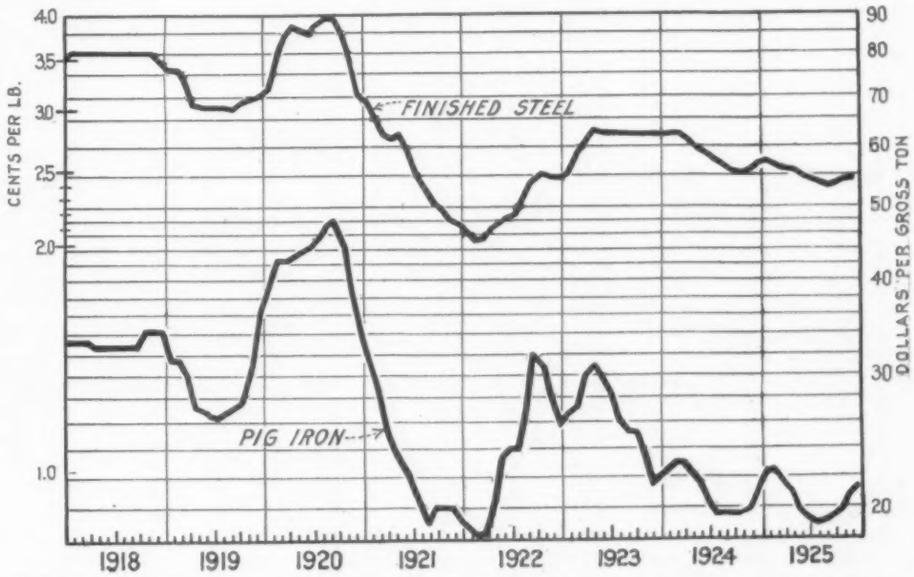
total of iron thus sold by steel companies during the year was more than 1,500,000 tons.

MERCHANT FURNACES HARD PRESSED

On Dec. 1 only 50 merchant furnaces were in blast out of 107 in the country. The total number of furnaces in operation on that date was 220, and of these 165 are owned by steel companies. Five furnaces which were making ferroalloys are not included in this calculation.

With high operating costs, low selling prices, foreign competition and the selling of surplus iron by the steel companies, the merchant furnaces have had a situation to contend with that clearly points to a new regime in the production and sale of pig iron in the United States.

This year will bring into operation in the East two new furnaces which have been built in conjunction with by-product coke plants. It is evident that the promise of profit for merchant blast furnaces here-



FLUCTUATIONS Over Eight Years in THE IRON AGE Composite Prices of Pig Iron and of Finished Steel (Seven Leading Products). While the two have moved approximately in parallel lines during the past year, this is in sharp contrast with what happened in 1923 and 1924. Average levels in 1925 were, for pig iron, the lowest in ten years; for finished steel, the lowest save those of 1922

after lies in more economical manufacturing, such as is possible when coke and chemical by-products are produced in conjunction with pig iron.

PRICES DECLINED FOR FIVE MONTHS

An advance in wages at merchant ovens in the Connellsville coke region added 75c. to $1 a ton to the cost of making iron at the beginning of 1925. However, in April independent coke companies put wages back to the old level. Furnace operators had good backlogs on their books, carried over from the fourth quarter buying of 1924, but their efforts to advance prices of iron to cover increased fuel costs met with little success. The average price of pig iron in January was $22.44, according to THE IRON AGE composite, and this advanced to $22.50 for February, the highest point of the year. The decline was steady though small each month, until the low point of $18.96 was reached in July, the month of lowest output.

The gain both in prices and production began with August and continued to the end of the year. Thus the price average for December was $21.54, or $2.58 above the low point of the year, but the December average was 96c. per ton below the February average, the highest of the year. December pig iron output was considerably above that of November, but fell below that of January, March and April.

COKE FLURRY IN OCTOBER

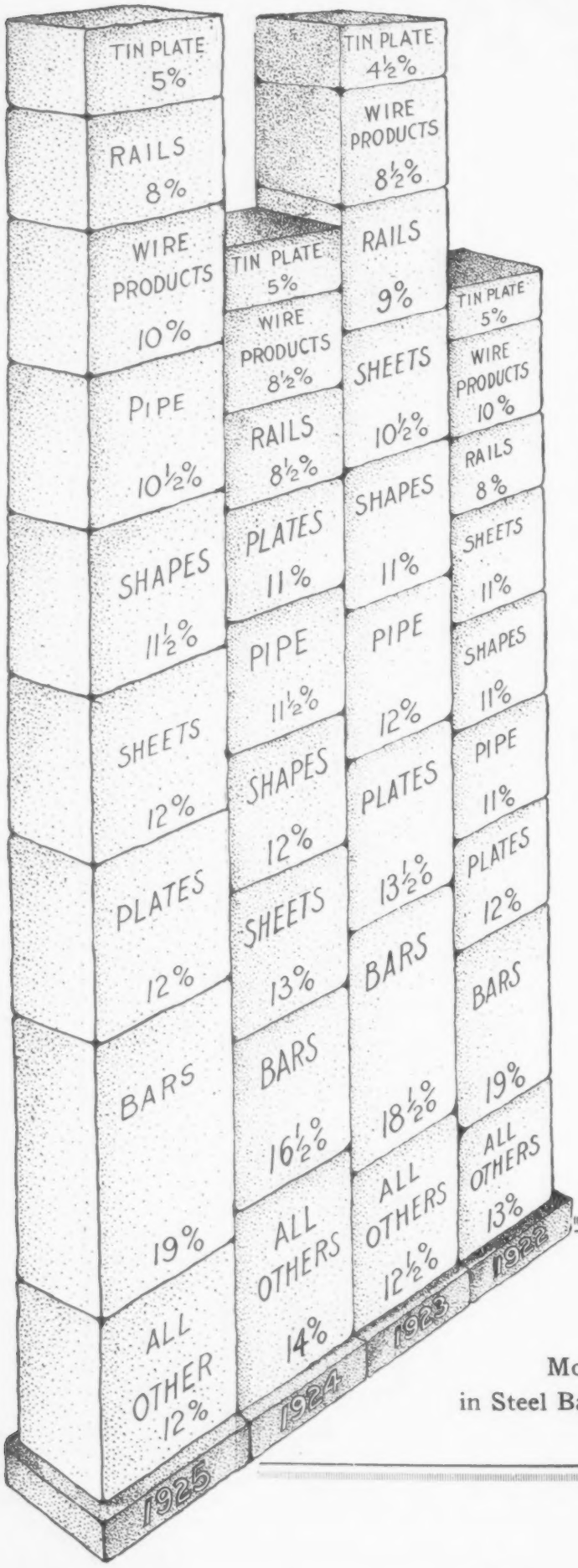
The pig iron buying movement which accompanied the October coke flurry was the nearest approach to an active market, but this did not compare with the buying wave in the soft coal strike of 1922, which carried prices to very high levels. Due to the anthracite coal strike, which started Sept. 1 and was on at the end of the year, coke for heating purposes sold up to $10 a ton, and this brought spot blast furnace coke up to $8.50. However, increase production soon brought a change, and by Dec. 1 spot blast furnace coke was down to $3.85, with first quarter contract coke at $4. Later, as an early settlement of the anthracite strike seemed unlikely, the coke market advanced. Several steel companies sold coke in October, because of the very good profit in the prices of that month.

During most of the year the advantage was very much with the pig iron buyer. This first became pronounced when a reduction of 50c. a ton on Mesabi non-Bessemer ore was announced in April. The subsiding of demand from foundries and other users of merchant iron became noticeable in March, and the excess of supply over demand was a controlling factor from then until October. The last two months of the year found the active furnaces in the best position they had known in some time. On the October rise in demand they began selling beyond Jan. 1, and by mid-November many of them were well sold up for the first quarter of 1926. Foundry iron prices reached $22 at Birmingham, $23 at eastern Pennsylvania furnaces, $23 at Chicago furnaces and $21 at Buffalo. Many of the first quarter sales were made at prices somewhat less than these, but on shipments in the early part of this year there will be a fair margin above the 1925 shipping average.

Gains in Foundry Output

The larger merchant pig iron consumption in 1925 than in 1924 was in part an index of the increased production of castings by iron foundries. All foundry operations have gained in the last few months. Steel foundries are now operating at about 60 per cent, gray iron foundries at 75 to 80 per cent and malleable iron foundries at 65 per cent. This compares with a 50 per cent operation for steel foundries at the beginning of 1925, 60 per cent for gray iron foundries and 50 per cent for malleable iron foundries. There has been a marked improvement among heavy-work foundries and those operated by agricultural machinery companies, which until mid-year were operating at a low rate. There is some shortage of skilled molders and core makers, as not a few have dropped out of the trade because of lack of continuous employment during the past five years.

What Steel Was Made and Where



HOW much of various forms of finished steel was made in 1925 and how much of each went into different major industries are told by the accompanying illustrations and tables. Based on returns from steel companies making 27,812,000 gross tons of finished and semi-finished rolled steel and on an estimated output of steel ingots for the whole country last year of 43,925,000 tons, the 1925 production of rolled steel, not including re-rolled material, was 32,500,000 tons. This amount is not merely 19 per cent more than in 1924 but is nearly 200,000 tons more than the record of 1923, when 32,321,000 tons were made. The ingot output, also a record, goes back to 1917, when production amounted to 43,619,000 tons; in that year, heavy cropping of war steel specifications probably accounted for the smaller percentage yield in rolled products.

The full returns show that 85½ per cent of the total production was represented in the figures covering the output of the several forms of steel—rails, shapes, wire products, sheets and the like. And the fact emphasizes at the end of another year the cooperation of the producers in the necessarily heavy task of compiling in detail from a mass of records.

Further, as was done at the last few year-ends, figures were requested as to the distribution or consumption of the steel by various major industries. These were supplied by companies making 21,342,000 tons, or 65½ per cent of the total. This year, it was decided also to try to get a line on the consumption of what may be termed the first rank of buyers, that is, the amounts of steel taken by various classes of direct customers of the steel maker. A third of those reporting the sales distribution gave such figures. These companies made 7,360,000 tons, or 22.6 per cent of the total. It is believed that consumption figures will have added value, at least for sales managers and others in shaping policies, if given in terms of direct customers as well as for the broad channels of consumption.

In total production 1925 is a record by

Record Production in Rolled Steel—½ Per Cent More Than in 1923—Chief Increases in Steel Bars, Shapes, Sheets and Tin Plate

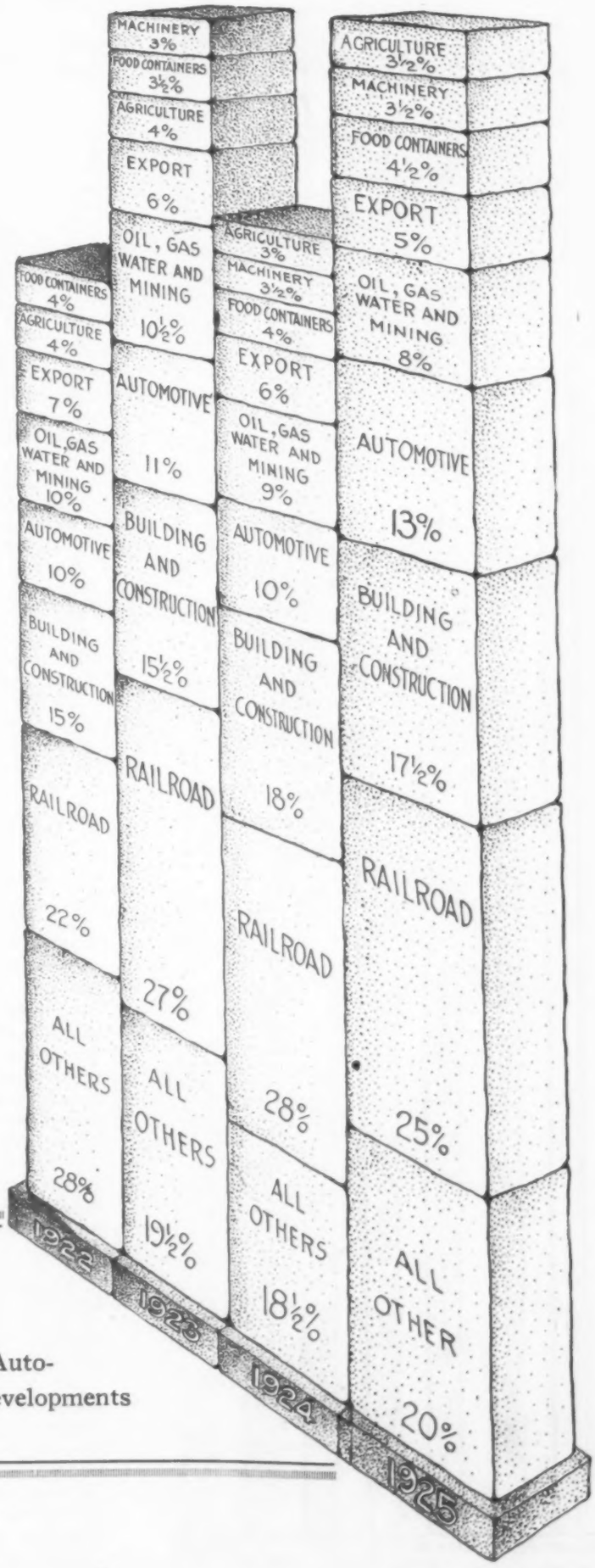
It Went in Nineteen Twenty-five

½ per cent excess over 1923. A table of the tonnages by kind and distribution is given on page 10.

Steel bar output on the face of the returns, including concrete bars rolled from billets, appears very large, or one-third more than in 1923. Similarly a record is shown in structural shapes, nearly one-ninth more than in 1923, and in tin plate almost as great an increase. Sheet production of 1925 exceeds that of 1923 by 2 per cent. The output of plates and pipe fell off as compared with the large production two years ago but of course exceeded that of 1924. Rail manufacture of 2,595,000 tons in the heavy sections was 370,000 tons ahead of the previous year and only 25,000 tons behind 1924. Bars, plates and shapes —the heavy tonnage products, so called— accounted for 42½ per cent of the total.

Railroads easily took most of 1925's steel. Although the percentage of the total dropped from 28 to 25, in contrasting the last two years, the total production of the country was so great that the 25 per cent in 1925 meant 500,000 tons greater absorption by the railroads than in 1924. To building and general construction work went 5,622,000 tons last year, against about 5,000,000 tons in the year preceding. The automotive industry took the impressive total of 4,228,000 tons.

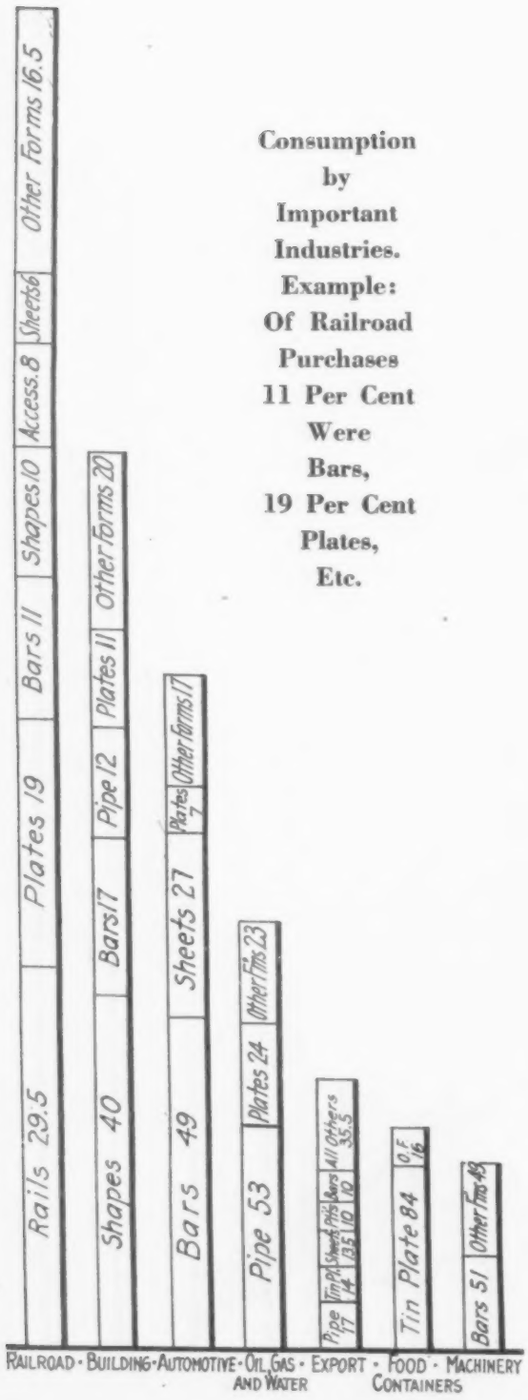
The diagrams on these pages are proportioned to show the relative volumes taken by the industries, and the percentages of the different chief forms of rolled steel. They are intended to show at a glance the relationship among these divisions for the past four years. Besides the major drawings, there is a chart on page 8 showing by industries the kinds of steel taken by each and the relative importance of these kinds of steel to the industry, and on page 9 a chart showing how much of each steel product is sent to the different industries. In connection with each of these charts is a table showing the percentages in detail. For example, the table on page 8 shows for the automobile industry what percentage of



Again About Two-Thirds of the Steel Was Absorbed by Railroads, Construction Work, Automobiles and Oil and Mining Developments

Forms of Steel Different Industries Took in 1925, Showing Percentages Making Up the Total for Each Industry

	Rails	Track Accessories	Plates	Shapes	Bars	Sheets	Tin Plate	Wire Products	Pipes and Tubes	Hoops, Bands, etc.	Blooms and Billets	All Other
Automotive (inc. trucks, etc.)	..	..	7	1	49	27	..	5	..	7	2	2
Railroads (inc. cars and locomotives)	29.5	8	19	10	11	6	..	3	2	..	5	6.5
Agriculture	..	1	6.5	4.5	26	9.5	..	41	1	4	4	1.5
Buildings, bridges and other construction (not railroad)	..	..	11	40	17	8.5	..	7.5	12	1	..	2
Shipbuilding	..	1	39	22	11.5	4.5	..	3	3	..	6.5	8.5
Food containers	..	..	1	..	..	5.5	84	3	..	5.5	..	..
Machinery (elec., textile, machine tools, etc.)	..	..	10	8	51	7	..	5	..	10	3	4.5
Oil, gas and water	5	1	24	4	4	2.5	2	3	53	1	1	..
Exports	9.5	1.5	10	9.5	10	13.5	14	9.5	17	1.5	..	3
Miscellaneous	4	..	6.5	3.5	18	20	3	25.5	11.5	2.5	2.5	2



Consumption by Important Industries. Example: Of Railroad Purchases 11 Per Cent Were Bars, 19 Per Cent Plates, Etc.

the steel required for automobile manufacture was supplied in the form of bars or in sheets. Similarly, the table on page 9 shows how much of the total production of wire products, for example, was taken by the building industry or by the railroads or was exported.

On page 10 is a table which shows in units of 1000 gross tons the distribution of steel for 1925. From this one may gather what tonnage of rails was taken by the railroads or what tonnage of structural shapes was used by the building industry or what amount of plates was required for the making of tanks in oil developments. Estimated totals give the entire consumption for the different industries and for the entire production of the different forms of steel.

As was the case in 1923 and 1924, nearly two-thirds of all steel was absorbed by the combined demands of railroads, building and construction work, automobiles and what may be classed as oil and mining developments.

The steel exported was 5 per cent but represented about as much as the 6 per cent of the preceding year.

The innovation in the analysis for the past year is the distribution given by companies making 7,360,000 tons of rolled steel. A diagram appears on page 10 to show this. From the circle representing the country's output lines radiate to smaller circles representing proportionately to their takings the purchases of the customers of the companies. From these in turn radiate lines to indicate the further distribution, manufacture or transformation to the major industries or channels of consumption. The aggregate area of the inner ring of circles is of course equal to that of the central ring, save for the circle denoting the volume of exports, and likewise there is equivalence in area in the aggregate of the outer grouping of circles.

Automobile makers, railroads, building contractors and fabricators and jobbers rank high as buyers. The total tonnage shipped to jobbers was 9½ per cent. What the jobbers purchased was subsequently allocated on the basis of information received from jobbers to the major industries covered in this study.

Next in size among the steel buyers were the oil and mining companies, makers of machinery, boiler and tank manufacturers, can makers and makers of forgings. Based on questionnaires to boiler makers and forging companies, the tonnages distributed to these first line of consumers were allotted then to the final group of consumers. Finally in the order of their importance were stove and metal furniture makers, electrical manufacturers, bolt, nut and rivet makers, concrete bar companies, shipbuilders and agricultural implement manufacturers. The returns indicated that the miscellaneous class of customers included manufacturing consumers specializing in wire goods and in stamping and forming sheets.

What Percentage of Each Form of Steel Was Distributed in 1925 Among the Industries

	Automotive	Railroads	Agriculture	Buildings and Const'n	Shipbuilding	Food and Other Containers	Machinery	Oil, Gas, Water and Mining	Exports	Miscellaneous
Rails	..	82	..	..	..	..	..	4.5	5.5	8
Tie plates, etc	1	83.5	2	..	1	..	1	3	3.5	5
Plates	7	39	2	16	3	..	3	16	4	10
Shapes	1.5	21	1	59.5	2	..	2.5	2.5	4	6
Bars	33	14.5	5	15.5	..	..	9.5	1.5	3	17.5
Sheets	29	12	3	12.5	..	2	2	2	6	31.5
Tin plate	..	..	..	..	..	70	..	3.5	14.5	12
Wire products	7	7	14.5	13	..	1.5	2	2	5	48
Pipes and tubes	1	5	..	21	..	..	..	42.5	8.5	21.5
Hoops, bands, etc	34.5	3	5	8	..	9	14.5	3.5	3	19
Forging billets and blooms	85	51	6	3.5	2.5	..	4.5	4.5	..	18.5
All other	7.5	53.5	2	11	3	..	5.5	1	5.5	11

Of the large consuming industries more is said on other pages, including details of the takings of the railroads. On page 104 is a statement of the consumption of the automobile trade, and immediately following is an account of the demands for building work.

Building in 1925 Breaks Records

BUILDING construction in 1925 broke all records and this total is of unusual significance to the steel industry in that there was a large gain in commercial buildings and structures of other types requiring the use of fabricated steel. Even in residential construction the greatest gain was in apartment houses with steel framework.

Figures compiled by the F. W. Dodge Corporation, New York, covering 36 States, other States being estimated, showed a total for the 11 months ended with November of $5,310,950,000, to which is added an estimate for December of $480,000,000—a total of $5,790,950,000 for 36 States. The total of the remaining States will, it is believed, bring the grand total close to $6,500,000,000. Estimated totals for the entire country beginning with 1913 are given as follows:

1913	$1,189,700,000	1920	$3,337,600,000
1914	1,005,400,000	1921	3,068,900,000
1915	1,269,100,000	1922	4,329,700,000
1916	1,834,000,000	1923	4,768,100,000
1917	2,195,000,000	1924	5,237,100,000
1918	2,294,200,000	1925	6,500,000,000*
1919	3,142,500,000		

*December estimated.

Gain in Floor Space As Well As Values

A better basis for a comparison of the growth in building construction over a period of years lies in the figures on floor space as the dollar values have varied of course in part because of varying costs of construction and materials. The square footage of floor space erected in 27 States from 1919 to 1925, inclusive, is figured by the F. W. Dodge Corporation as follows:

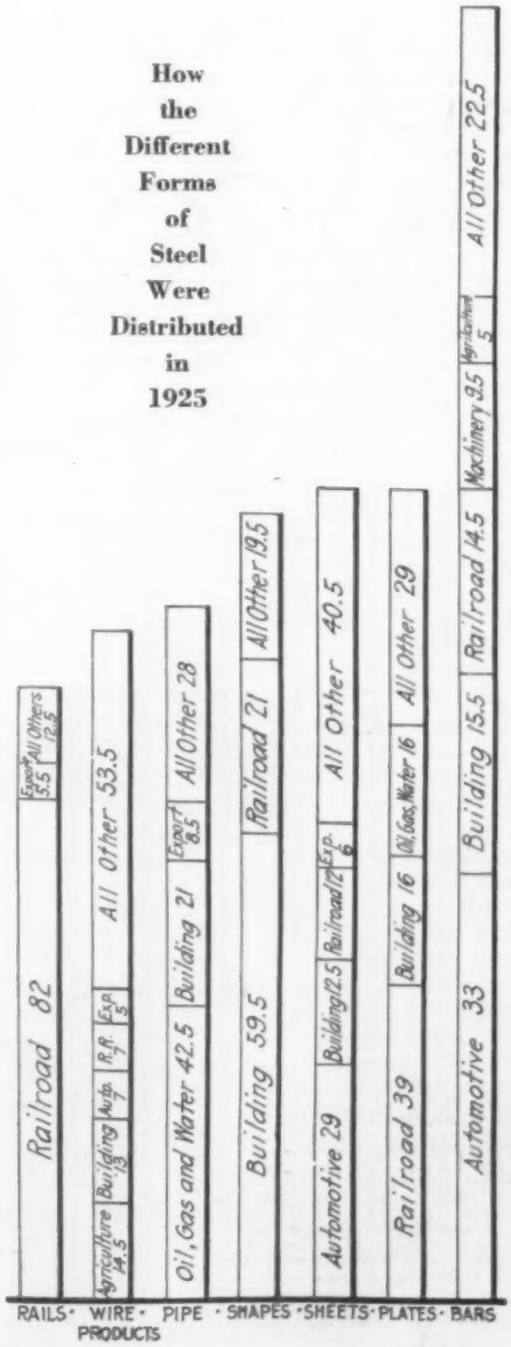
1919	$559,218,600	1923	$598,621,000
1920	412,397,000	1924	603,083,000
1921	389,418,200	1925	770,000,000*
1922	581,136,400		

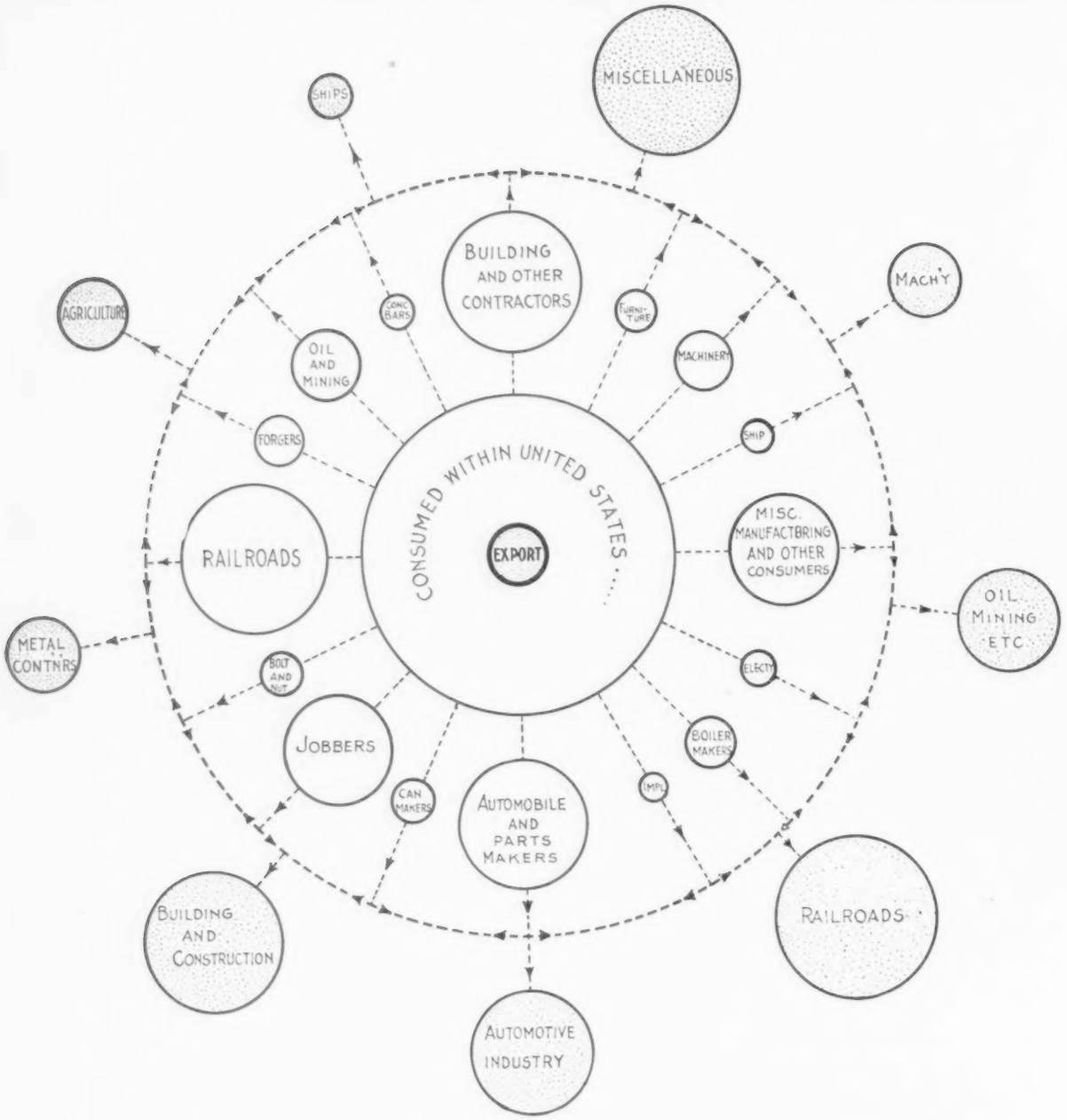
*December estimated.

Growth of Commercial and Residential Buildings

In 11 months of 1925 the total square footage of floor space in commercial buildings, for which contracts were awarded, was 137,673,400, as compared with 103,473,400 sq. ft. in buildings of the same type contracted for in the same period in 1924. The value of these buildings was $555,072,400 in 1924 and $767,903,800 in 1925. Another class of buildings in which there was a large increase is residences, many of which were of the large apartment house type. Residential buildings contracted for in 11 months of 1925 totaled 492,208,800 sq. ft. of floor space as compared with 388,790,100 sq. ft in the same period of 1924. Residential buildings contracted for in 11 months of 1925 had a total value of $2,421,774,000 as compared with $1,885,736,200 in the corresponding period of 1924.

How the Different Forms of Steel Were Distributed in 1925





FROM the circle representing the country's consumption, lines radiate to smaller circles representing proportionately to their takings the purchases of direct customers of the steel makers. From these in turn radiate lines to indicate the further distribution, manufacture or transformation to the final major industries or channels of consumption.

ESTIMATED CONSUMPTION OF STEEL IN 1925

(Thousands of Gross Tons)

Approximate Amount of Each Form Taken by Each of a Number of Industries

	Railroads	Building and Construction	Agriculture	Auto mobiles	Oil, Water, Gas and Mining	Metal Containers	Machinery Makers	Ship-Building	Export	Miscellaneous	Totals
Heavy Rails	2,400	5	2	1	15	....	3	...	145	25	2,596
Light Rails	6	1	....	3	112	....	2	...	16	212	352
Track Accessories	665	3	17	11	23	....	6	5	29	38	797
Plates	1,540	606	72	270	635	10	116	127	171	388	3,935
Structural Shapes	800	2,250	49	53	96	....	92	72	161	220	3,793
Bars	910	970	298	2,070	97	8	599	37	172	1,081	6,242
Hoops, Bands, Cotton Ties, etc.	27	68	42	289	30	74	120	2	25	161	838
Tin Plate	1	2	1	....	59	1,170	1	...	243	197	1,674
Sheets	472	485	108	1,140	70	79	80	15	230	1,235	3,914
Pipe and Tubes	169	685	14	27	1,420	5	7	9	289	714	3,339
Wire Products	227	413	467	220	65	42	59	10	162	1,563	3,228
Billets	411	29	48	70	35	8	34	21	1	151	808
All Others	529	105	18	75	8	....	52	28	54	115	984
Totals	8,157	5,622	1,136	4,229	2,665	1,396	1,171	326	1,698	6,100	32,500

An "Iron Age" Interview with Mr. Schwab

The East as a Great Producer and Consumer of Steel.

Chilean Ore at Six Cents a Unit at Sparrows Point.

Steel Companies, Making Enormous Outlays to Reduce Cost, Should Get Better Return.

Expansion to Be Looked for in Every Line of Steel Consumption—Replacement a Large Factor

CHAIRMAN CHARLES M. SCHWAB of the Bethlehem Steel Corporation made an arresting statement on his last visit to the Sparrows Point, Md., plant—a notable inspection trip on which he and President Grace were accompanied by other officers and directors of the corporation and by representatives of large stockholding and bondholding interests:

"My hope is that eventually we shall have at Sparrows Point the greatest steel plant in the world."

Mr. Schwab's position as a prophet of greater things for the American steel trade is well known. The prediction he made to J. Pierpont Morgan 25 years ago when the United States Steel Corporation was in the making has been often recalled. Previous to 1901 the country's greatest output of ingots and castings (in 1899) had been only about half a million tons beyond the 10,000,000-ton mark. Mr. Schwab told Mr. Morgan that within a few years the industry would double its record by producing 20,000,000 tons in a twelve-month. In 1905, four years after the Steel Corporation was formed, the prediction came true, and there was 23,947 tons above twenty millions, for good measure. Later Mr. Schwab, in the face of much skepticism, set up a 30,000,000-ton bogie for 1920, and was called an incurable optimist. The steel industry clipped eight years from his time limit, and made 31,251,000 tons in 1912. And in 1925, only five years after the one Mr. Schwab picked for a 30,000,000-ton performance, the country got more than half way on the road to 60 millions, turning out roundly 46¼ million tons of ingots and steel castings.

> While his Sparrows Point expression was a hope rather than a prediction, THE IRON AGE asked Mr. Schwab if he would not comment upon it and upon his manifest faith in the East as a section of large possibilities both in production and consumption of steel.

"That might seem like blowing my own horn," was the reply. "However, I am glad to comply with a request of THE IRON AGE, of which I have been for so many years an appreciative reader.

The East's Advantage on Ore

"Eastern steel plant development is in response to the growing demand for steel from the great consuming districts of the country. Some of my friends in the industry in the Central West have now and then raised a question as to my partiality for Eastern locations for steel making, seeing that I was for so long identified with the Pittsburgh district. I have always believed in the possibilities of the Eastern section of the United States as a user of steel.

"If you look at the question from the standpoint of raw material costs, a study of the iron ore situation would be a deciding factor. Looking toward Lake Superior, I saw costs steadily advancing and the quality of the ore steadily declining. In the old days I could get ore properties there at royalties ranging from 10 to 25 cents; today these royalties have gone to $1.25 and $1.50. Taxes on Lake ores have increased several fold, and there have been successive advances in labor cost. On the other hand are the low mining costs in Chile, which have been stable over a long period, and substantially that is the case in Cuba. Our Chilean ore runs 67 per cent in iron, whereas Lake ores that once averaged about 60 per cent in iron are now down between 50 and 55 per cent.

"Chilean ore hauled 4400 miles can be laid down at Sparrows Point at $6 for the ore required to make a ton of pig iron, or about 6c. per unit. While Pittsburgh has its advantage on fuel, the ore advantage of the Eastern seaboard plant is such that pig iron can be made more cheaply at Sparrows Point than at any point in the Middle West.

"The marked advance in rail transportation cost is another factor in the greater future of the Eastern steel industry. When I started making steel at Pittsburgh we had a $2 freight on finished steel to the Atlantic seaboard. Today the rate is $7 a ton. That is a great difference. And there is no reason to believe that rail freights will tend lower in the future. The higher cost of railroad operation is here to stay.

A Great Steel Market in the East

"If you speak of markets east of the Alleghenies, think of the scale of railroad operations in this most densely populated section of the country, and of the large track and car and locomotive requirements. The number of metal-working plants in the East and the number and range of their products are well known. Almost the entire output of our wire mills at Sparrows Point is taken up by spring works and other industrial users of wire in New England and the Middle Atlantic seaboard. Speaking of structural steel, where has there been such a use of it as we have seen in New York City and other points on the Atlantic seaboard in this present wave of new construction? And the East will continue to lead in construction, for there is no end to the rebuilding such as we see so strikingly in New York. Here the steel construction of the next ten years will far exceed what are called high records today."

> "Are there any signs, Mr. Schwab, that the steel industry is losing any of its enormous appetite for capital? Rebuilding and

(*Concluded on page* 95)

Machine Tool Progress in 1925

A Year of Marked Improvement in Product and of Expanding Sales, but Profits Were Not Adequate—Greater Domestic and European Demand Ahead

BY COL. FRANK A. SCOTT*

AT the beginning of 1925 the dawn of better business in the metal-working industries was breaking. However, the sunlight of prosperity is still obscured somewhat by the clouds of a low-price situation which are but slowly being dispelled. During each recurring period of recession in the machine tool business there have not been wanting those doubting friends who feared for its future. In this respect the last one was no exception. The results of 1925 and the prospects for 1926 have laid those doubts at rest. Prosperity in the machine tool industry is here, or at least the demand for the product is here, and prosperity is assured whenever the price factor is adjusted to present costs.

The over-expansion of the war period and the caution engendered by depression and severe competition have maintained a buyer's market for a period longer than is usual in business cycles.

Modest But Not Reasonable Profit

The machine tool industry moved steadily upward last year. Sales volume increased—was larger, in fact, than in any year since the war; inventories melted; labor was more in demand and more steadily employed. Modest profits will be shown. This is all very good, but there is a fly in the ointment. In common with iron and steel producers, the industry is showing less return on its investment than it should; it is not unreasonable to say less return than it deserves. Also in common with the steel industry, its contributions to national prosperity have been vast and call for reasonable, if not liberal, reward. Let us examine this claim.

The American machine tool industry may be said to date from Eli Whitney, the father of mass production and interchangeability in metal working. It has kept pace with the development of the iron and steel industry of the United States.

Our Machine Tool Equipment Far Exceeds All of Europe's

All modern countries necessarily use machine tools substantially in proportion to their production of pig iron. This rule has a few exceptions (India is one); but in general the statement is sound. Worked out on this theory, the volume of American machine tool equipment now operating in our country is much greater than that of all Europe, for the pig iron production of this country has averaged about 34,000,000 tons in the past four years, while that of Germany, England, France, Belgium, Poland and Russia in the same period has averaged less than 24,000,000 tons.

There is this marked difference, however, between the American machine tool status and that of Europe. The American equipment is aggregated into productive units on the basis of mass production to a degree absolutely unknown in European countries, except as they may be familiar with our methods. The possibilities of this situation, in world commerce, are almost incalculable in a metal-working age when the transportation, communication, comfort and protection of the world's inhabitants rest upon a foundation of metal-working ability.

American ingenuity in design, high standards of workmanship, and finally the development of automatic and semi-automatic machinery capable of machining a product within limits of accuracy superior to the best handcraftsmanship, give America world leadership as a metal-working country.

A Year of Many Improvements

Nineteen-twenty-five has witnessed a continuance of the orderly development in machine shop practice, all tending toward the lessening of time on operations, decreased investment per unit of product, ease of operation, increased security to the operator, and better quality of work.

A recitation of improvements would involve practically every element of machine shop equipment, but mention might be made of progress in the milling field, and especially in grinding, with particular reference to centerless grinding. Significant and important changes have been made also in measuring and testing equipments in the leading plants. This element alone is well worth the attention of executives charged with the rapid production of accurate work. The need for liberality in investment in jigs, fixtures and standard small tools is becoming almost universally recognized.

A New Metal-Working Era

Added to mechanical efficiency, the American machine tool industry possesses commercial soundness. The stability and conservatism of the industry are shown by what occurred in 1920-1921, a period of the hardest pressure upon metal-working industry within the memory of two generations. Not one of the leading units of the machine tool industry succumbed, or even faltered during this time of trial. Indeed, the industry emerged from this period of distress and discouragement with evidences of greater power and vigor than it had ever shown before.

The machine tool exhibit brought together at the convention of the American Society for Steel Treating, held in Cleveland last September, contained a greater number of new designs than any similar aggregation of machine tools which the country had seen at any previous period. Even experienced machine tool men were surprised at the advance which had been made.

This advance in design and productivity of machine tools has been so complete and rapid since the war that it marks the beginning of a new metal-working era. The new era will see a greater volume of production from a smaller number of machine tools, occupying less space, employing fewer operators, requiring less conveying machinery and other forms of overhead service for their continued operation, and less skill on the part of the operator to produce a product of increased accuracy: in short, a saving in both productive and non-productive cost. This statement may be made in sweeping fashion with the perfect confidence that

*President Warner & Swasey Co., Cleveland.

the more careful the analysis the more certainly will the truth of the statement be borne out.

New Benefits to Smaller Producer

Fortunately the advantages of these improvements are available not alone to those engaged in mass production, but to the smaller producer as well. Present day machine tools reduce the costs of work produced in lots of five to fifty by combining the advantages of the quantity production types with the ease of set-up necessary for small lots of work.

Standard tooling equipment for these machines is also now available, making it possible to increase production substantially in the small lot field with a low tool cost and a low set-up time. One machine tool producer found that the installation of his product among the small-lot producers in 1925 resulted in an average reduction in production time of 57½ per cent. Such results show the importance of recent developments in machine tools for the many thousands of small-lot producers in this country.

We have shown the rosy side of the industry's accomplishments: what it has done for those it serves. Now, what has it one for itself? This phase of the story is not so impressive.

To visualize the machine tool industry, it must be remembered that during its entire history it has been in the hands of men whose primary training, interest and ambition were mechanical. The commercial side of the business was a necessary evil. The possible joys of the work lay in new and greater mechanical accomplishments, not in higher prices and swelling money bags. The natural result of this has been an underpriced product; so that today it is easily demonstrable that tools with a life of ten years are sometimes sold at prices which, when compared with tool productivity, pay for themselves in the first year.

The disposition toward under-pricing the product is common in the American metal-working field. Nothing that comes into our markets as a contribution to the comfort of our people can be compared in price with the metal articles of our daily lives. Only those produced under conditions that have become to a considerable extent non-competitive form an exception.

Herein, then, we find one of the real problems for the machine tool industry during 1926: Can the users be made to understand the need for a more liberal attitude on the subject of price?

Better Market in Europe—Many Foreign Visitors Here

The European market for American machines improved markedly during 1925. The used tool supply has practically disappeared, and although there has been no national expansion in any of the countries, many individual plants here and there have readjusted themselves to post-war conditions, with little machine tool buying as a consequence. In some cases American capital has stimulated this readjustment. This fact is clear: Europe can supply its needs for primary forms of machine tools; and it is only when great accuracy is required, or when the volume that admits of automatic and special machinery has been reached, that we are really needed.

The greatly increased efficiency of production in the metal-working industries of the United States has attracted notice throughout Europe, and the fear of increased competition from this country in the world markets, felt in all foreign countries, is based, and wisely so, upon the increased productiveness of our factories.

Nineteen-twenty-six should show continued improvement in the European market. Foreign manufacturers are so well aware of the advantages we are enjoying through advanced types of machinery that they were visiting America in a steady stream throughout all of 1925, studying especially our automatic, semi-automatic and special purpose machines. The Locarno treaty, the progress of the Dawes plan, debt readjustments and other stabilizing influences during the year will contribute to improved markets there, provided the French situation works out satisfactorily.

Other Foreign Markets Growing

Foreign markets outside of Europe have also been better during 1925, especially in the Far East and South America. It is to be hoped that as the disposition of American bankers and capitalists to extend investments outside the United States increases, as it must continue to do now that we are a creditor country, we may develop the keen national sense for foreign trade which is evident in the methods pursued by Great Britain, France and Germany when financing foreign projects. It is commonly required by the bankers of those countries that the capital advanced, when used for the purchase of articles produced in the country supplying the capital, shall be expended in such country. A return of capital in this fashion to our own country, to be expended chiefly among our metal-working industries, would result in one hand washing the other, in a manner advantageous to the borrower, as well as to our national industrial life. We should have the less reluctance to impose such a condition

(*Concluded on page* 95)

COLONEL SCOTT'S prognosis for the past year, as it appeared in THE IRON AGE *of Jan.* 1, 1925, *was this: "All the conditions observable in the business barometer indicate that the period of depression in the machine tool industry is over and that we may look forward with confidence into* 1925." *He predicted a year "notable in American business achievement, provided industry and labor exercise self-restraint and avoid such increases in cost and price as might overload the business vehicle."*

As Colonel Scott points out in the present article, the increases in cost and price were avoided; indeed, prices were lower than they should have been.

In an admirably complete and highly competent analysis of the situation in the metal-working industries, the author points out, among other things, that a great advance has been made in design and productivity of machine tools; that the makers are coming out of the post-war period of distress with greater vigor than they have ever had, and that Europe has sent a steady stream of visitors to this country to study our advanced types of machinery.

Foundries Using Better Equipment

Greater Output Per Man-Hour Is Secured by Means of Sand, Mold and Metal Handling Devices—Advance in Mold and Core Production

BY HENRY M. LANE*

PROGRESS of all kinds has always refused to recognize definite dates as the beginning or end of any cycle of events, but in spite of this mankind persists in taking stock once a year of what has occurred in the past, and it is wise to observe the tendencies and study the situation as to how and whither we are headed.

The past year has not seen much in the way of revolutionary foundry methods but rather steady improvement and a careful study of handling situations. The present immigration laws make it necessary for us to conserve labor to the greatest possible extent. Also, if this nation is to repeat its history following the Civil War, it is more than ever necessary that we increase the output per man hour in order to reduce the cost of the product to such a point that we can compete with the manufacturers of the Old World with their lower labor rates. We have always thought and acted along the line of labor saving and mass production and the past year has seen improvements in some of the devices and many little schemes and plans for taking care of output under existing labor conditions.

More Attention to Proper Conditioning of Sand

A great many foundries are recognizing more and more the necessity of properly conditioned sand for the economic production of high grade castings. The proper conditioning of the sand means a better finish on the casting, less expense in the cleaning room, and less scrap loss on the one side and an economy of sand on the other.

About 20 years ago the writer started an extensive series of experiments looking toward the reclamation of old sand and its rejuvenation for reuse in the foundry. An experimental laboratory was constructed in Detroit and nearly 2000 tons of sand were reclaimed. Approximately 200 tons of castings were made in this reclaimed and rebonded sand, these castings covering the field of converter, open-hearth and electric steel, heavy and light gray iron, brass, bronze, and aluminum. At that time, however, conditions were not right for the introduction of this on account of the lack of education of the personnel of the foundry itself and the tendency of the old type of foundry foreman to make any new introduction of this kind an alibi for all bad work and at times even to grow careless or to deliberately spoil work in order that he might prove a "newfangled rig" no good. With the education of foundrymen through association meetings, exhibits, and as the result of articles read in the press, as well as through the introduction of technically trained men in the foundry, we are now facing very different conditions. While the experiments of 15 to 20 years ago were successful as experiments, yet resulted in no improvements, we now find on the market equipment for rejuvenating sand, and foundries are willing not only to experiment but are actually putting this practice into dollar-saving daily routine work. Various types of sand-mixing and handling equipment, from the ordinary pan mill of the Simpson type, with or without a loader, up to extensive handling systems involving mixers, sand handling and delivery equipment, have been introduced into such plants.

Sand handling has also been made necessary by the increase in mold handling installations, which have in turn been called for to take care of the increased output that can be derived from some of the modern molding appliances.

We have long had in the foundry the traveling sand-mixer which runs along the sand heap and cuts it over. For many classes of plants this is a very efficient machine and it not only mixes the sand but serves to drift or pile it back beside the molding machine. Where machines of this kind are used, however, a large amount of manual labor has always been necessary to get the sand into a long pile or winrow so that the machine could do its work. Some foundries have tried to accomplish this with ordinary grab buckets but this is rather a slow job.

During the past year there has been developed a special electrically-operated grab bucket for the rapid cleaning of foundry floors and piling of the sand for

*President H. M. Lane Co., Detroit.

Fig. 2—Although the Blowing of Cores Is Not New, Applications Formerly Believed Impossible Have Been Devised. The blowing of the unusually intricate cores necessary in shower bath fixtures is practiced successfully at the plant of the Speakman Co., Wilmington, Del.

Fig. 1—Sandslinger Employed in Making Cores. A gang of 4 or 5 men can produce 1800 cores per 8 hr.

cutting, this device having been described in THE IRON AGE of Nov. 12, 1925, page 1310. It is a product of the Haywood Co., New York, and among other plants employing it is the foundry of the Goulds Mfg. Co., at Seneca Falls, N. Y. This sand piler in its open position has a spread of 16 ft. or more and as the crane lifts it any sand between the jaws is scraped up into a central pile. When the device assumes the closed position, it may be lifted straight up, leaving the sand in a pile. Of course, two things are necessary for the successful use of an installation of this kind; first, a good cement floor in the foundry, and second, a traveling crane of sufficient capacity to handle the sand piler. Sand pilers of the single line type are being brought out by other manufacturers of grab buckets.

Much Done to Increase Output of Core Room

The core room is a point which lends itself particularly well to certain economies and much has been done in the past few years to increase core room output. One of the recent developments, shown in Fig. 1, consists of a special stationary type Beardsley & Piper Co. Sandslinger mounted next to a turn-table on which a series of core boxes is arranged so as to pass in succession under the Sandslinger. With a device of this kind a gang of four or five men are turning out 1800 cores in eight hours and the cores are uniformly rammed, giving a superior product. This installation is in a plant of one of the largest motor car manufacturers in this country.

The blowing of cores is not new but the past few years have seen many applications formerly believed impossible. The so-called Hewlitt core machine as manufactured by the Demmler company of Kewanee, Ill., was developed to produce pipe fitting cores for the Western Tube Co. of Kewanee, which plant was later operated by the National Tube Co. and is now part of the Walworth Mfg. Co. In that plant the machines have been in successful operation for many years on pipe fittings. The original machine was rather heavy and cumbersome but in the past few years it has been simplified and a semi-automatic type brought out. One of the latter type used at the plant of the Speakman Co., Wilmington, Del., is shown in Fig. 2. When these machines were introduced the manufacturers of the core machine themselves did not believe it would be possible to blow the complicated cores necessary for the shower bath fixtures manufactured by Speakman company, but details in connection with boxes, etc., were worked out and the company is now blowing exceedingly complicated cores, achieving a reduction in cost and improvement in the quality of cores.

Particular attention is called to the fact that these machines are not provided with overhead or special sand delivery, the reason being that the relatively small volume of sand required and the mixes necessary for the types of cores would not at the present output warrant a sand delivery system. Many illustrations might be shown of plants in which the output is sufficient to more than warrant an overhead delivery and this is one of the features that saves a considerable percentage of the manufacturing cost in many core rooms. In fact, sand mixing and delivery in the core room should be as carefully worked out as in any other part of the plant.

Larger Production of Molds in Limited Space

In connection with mold production the introduction of the Sandslinger has made possible very large outputs in limited spaces. It is true that this machine acts as a ramming device but it is essentially a flask filler as well as a ramming device, and hence it is necessary to make some provision for feeding sand to it at a constant rate. The ramming operation of the Sandslinger can adjust itself to a variety of sand flow and still act efficiently. For this reason it is much easier to devise a proper sand feed for this type of machine than for other types of equipment. Fig. 3 illustrates a Sandslinger installation in the plant of the Cadillac Motor Car Co. at Detroit, together with the overhead sand delivery worked out in connection therewith. This machine serves to make drags, copes, and cheeks for cylinder molds and has proved very efficient for the purpose. Many other illustrations and details of Sandslinger installations could be shown but Fig. 3 gives a general line on the development which is being followed in many plants. The tractor type of Sandslinger takes

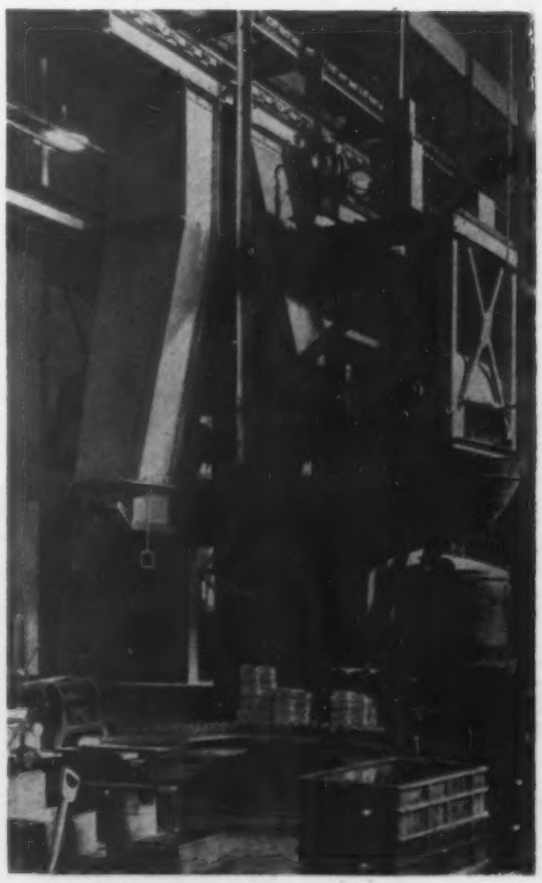


Fig. 3—Overhead Sand Delivery System Worked Out for Use in Connection with Sandslingers

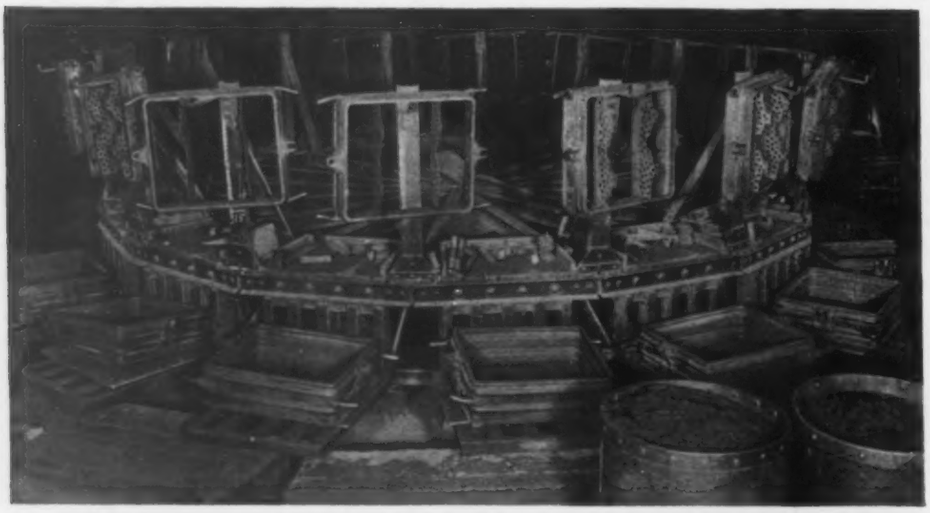


Fig. 4—Mold Table of Wheel Type Formerly Used by Dodge Brothers, Inc., but Superseded by New Design. This device illustrates an evolution in the conveyor line which it is important to take into consideration

up a large amount of floor space while the stationary type, here shown, with suitable mold conveying system permits of more intensive production per square foot of space available.

Conveyors Developed for High Output of Molds

If the molds are made in any device that turns out the large numbers produced on Sandslingers, jolt roll overs, and jolt squeeze strippers and other modern equipment, it becomes necessary to carry away and pour them, shake out the castings and return the flasks to the machines. To accomplish this, many types of carriers have been evolved. One of the early types was that devised by the Crane Co. and now used in many plants such as the Ford Motor Co., Whitehead & Kales Co., and others in which the molds are carried suspended from overhead track. This type of carrier has been described heretofore in THE IRON AGE. The objection to a conveyor of this type is the amount of overhead equipment necessary and the fact that it darkens the foundry more or less and is also more or less difficult to get at for maintenance and repair work.

Many attempts have been made to design conveyors working low down or near the floor. The idea of a wheel was one of the first devised in this connection and the variety of wheels is almost unlimited. One successful carrier of this kind is that shown in Fig. 4. This was developed by engineers of the Dodge Brothers, Inc., Detroit, and a number of these were in use for years but they have given way to a style described below. They illustrate, however, an evolution in the conveyor line which it is important to take into consideration. In this case the flasks were carried low, which made the closing of them easy. The spacing of the carriers as shown permitted of stepping between the flasks for closing on the copes and adjusting the clamps, and also for removing the empty cope flask from its hanger. The illustration shows the pouring position and the wooden platform upon which the pouring gang stand.

It will be noted that back of each flask there is a shelf containing the wedges, clamps, etc., for clamping the mold. These tables were revolved by power. At the time they were installed they gave a very excellent output. The problem, however, that confronted the Dodge engineers was an exaggerated condition of the problem confronting practically all foundrymen and that is the necessity of obtaining an ever-increasing tonnage in the same area. It was possible to place only two molding machines at each of these tables and there was a large amount of dead and unused space.

Rectangular Carrier Avoids Waste Space

The natural tendency to avoid the waste of space in the center of these round tables and in the corners surrounding them was to go to some form of straight line or rectangular carrier and Fig. 5 shows an example of a carrier of this kind used in the aluminum foundry of the Maytag Co. at Newton, Iowa. This carrier consists of a moving platform which forms a continuous metal surface. The one illustrated is for small work and is raised to a sufficient height above the floor to bring the molds into the most advantageous position for pouring. These carriers move about 4 ft. per min. and the workmen have no difficulty in pouring while the molds are in motion. The flasks are returned on the belt conveyor seen behind the molding machine, and the shakeout takes place at one end of the conveyor.

A similar conveyor used by the Maytag Co. for heavier work is shown in Fig. 6. In this case the carrier has been dropped to the level of the foundry floor so that the larger molds can be closed on it easily and

Fig. 5—Continuous Molding and Pouring Table for Small Work. The carrier is of a sufficient height to facilitate pouring and moves at the rate of about 4 ft. per min.

at the same time the pouring done without lifting the metal to any great height. The flasks are carried back to the molders on a separate carrier as in the previous case.

The carriers illustrated in Figs. 5 and 6 are of the power type and move continuously. In many plants it has been found more advantageous to use the so-called roller carriers such as employed in the brass foundry of the Speakman Co. at Wilmington, Del., and illustrated in the description of the Speakman Co.'s plant in THE IRON AGE of July 30, 1925, page 272. This installation shows that the carrier can be placed on an angle to take care of the angle considered necessary in the pouring of brass castings. A device of this kind will step up the output of a plant materially.

Fig. 7—Continuous Gravity Carrier at Plant of Wilson Foundry & Machine Co., Pontiac, Mich. The mold does not move, which simplifies pouring

Fig. 8—Drag-Type Rectangular Carriers for Handling Small Flasks in Dodge Brothers, Inc., Detroit Foundry. The pan conveyor on the floor serves to carry sand, castings, etc., to end of the shop

Fig. 7 shows another type of continuous gravity carrier in use in connection with Beardsley & Piper Sandslingers in the plant of the Wilson Foundry & Machine Co., Pontiac, Mich. In this arrangement there is plenty of room between the placing of the drag flask on the carrier and the closing of the cope for the coring of the mold, and the molds can be poured from a trolley ladle on the carrier. The molds stand still during the pouring, which simplifies the pouring problem.

With the roller carrier installed in the brass foundry of the Speakman Co., as noted above, a man pulls the molds to one end and shakes them out by hand. The type shown in Fig. 7 requires some device, generally in the case of the larger molds, for shaking out. A shake-out bail manufactured by the Stoney Engineering Co. of Cleveland has been employed in shaking out flasks with the aid of an air hoist and a short trolley, which serves in placing the flasks on a return conveyor. In the case of the larger and heavier flasks this is necessary in connection with straight-line carriers. The small flasks will be shaken out by hand and sent back on belts or carriers as illustrated in Figs. 5 and 6.

Drag-Type Rectangular Carriers Developed

It has been stated above that the table type of conveyor wasted space and limited the number of men that could be placed in the molding area in a given part of the foundry, and that the straight-line type of conveyor necessitated manual labor in handling flasks on the return conveyors. To overcome these difficulties engineers at the Dodge Brothers, Inc., plant have devised the carrier shown in Fig. 8. This consists of a series of cast iron plates which are dragged around on T-rails by means of a chain, the chain being guided around the corners by sprockets. The ends of two adjacent carriers are clearly shown in the illustration.

Extending diagonally across the space at the inside of the carrier there is an ordinary gravity roller conveyor which serves to bring the weights from the shake-out end to the pouring end. The ends of the carriers shown are at the pouring station. With a carrier of this type it is possible to put six or eight machines along the molding side of the carrier, to pour at one end, to have a long cooling phase shake-out at the opposite end and return the flasks and bottom plates to the molders on the carrier. In the case of some of the heavier work one part of the flask is returned by a gravity carrier over the conveyor.

Fig. 8 also shows in the foreground a pan conveyor running in the floor of the foundry onto which all

Fig. 6—Low Type of Continuous Heavy Work Mold Conveyor. The large molds can be closed easily and pouring is facilitated

molds are shaken out, this pan conveyor serves to carry sand, castings and everything to the end of the shop where the castings are separated from the sand. The sand then passes into the tempering system for return to the molders.

The advantages of a system of this kind are that it eliminates overhead equipment which darkens the shop and adds to confusion, and that the rectangular feature permits the placing of more men per running foot of foundry than can be accomplished with the parallel type of conveyors.

Savings Made in Delivering and Pouring Iron

The delivery of iron and the pouring of castings is also an important item. The rate of cooling has in many shops made it necessary to use hand ladles and shank ladles at the pouring stations, the iron being brought to these stations in some form of bull ladle either by crane, monorail, or track. The object in this system is to split the stream into parallel units, pouring a number of castings at one time and thus bringing the metal into the mold before it has time to cool, at the same time keeping within the melting capacity of the cupola and the iron requirements of the plant. By limiting the distance the men have to carry their iron and reducing their work to essentially nothing but pouring it has been possible to accomplish much in the way of dollar-saving in a problem of this kind.

The delivery of iron on a hand-pushed floor track system is slow and laborious and results in excessive cooling. The construction of many foundries makes it impossible to use traveling cranes and for this reason monorails have been resorted to. Here again we have the choice between hand-pushed and man-riding, power-controlled units. For short radiis of action where the pouring is close to the cupolas as in such continuous foundries as the Westinghouse plant at Wilmerding, Pa., and the French & Hecht plant at Davenport, Iowa, a light monorail taking the iron from the receiving ladle and delivering it to the molders is very efficient. Where it is necessary to distribute iron over a considerable area a more rapid form of conveyance becomes necessary. For this purpose the man-riding trolley ladle shown in Fig. 9 in which the man and ladle are in a fixed relationship to each other, both being situated in a cage which rises and falls, has been devised. Fig. 9 shows a further application of this device for use in direct pouring into the molds. Ordinarily the device passes down a monorail and pours into shank or hand ladles at the pouring stations. In the case illustrated, which is on the cylinder floor of the Cadillac Motor Car Co.'s foundry, a short section of monorail is suspended below a transfer crane and when the machine runs onto this section the operator by means of auxiliary controls in his cab can control the motion of the ladle in all directions so that he can pass down one side of a row of cylinders, pour them off and then swing to the opposite side of the gangway or jump over one row to the next. Recently this machine, which is covered by patent applications, has been improved to permit of swiveling the ladle either to the right or left so that a line of molds can be poured directly from a monorail without the use of a transfer crane.

There has been considerable development in the line of cupola charging, most of the new developments having been outlined in THE IRON AGE during the past year.

To sum up, we may say that the tendency seems to be toward introducing sufficient sand, mold and metal handling equipment to reduce the manual labor to a minimum and to increase the output per man-hour in the plant, and also toward the simpler form of conveyors and sand handling devices.

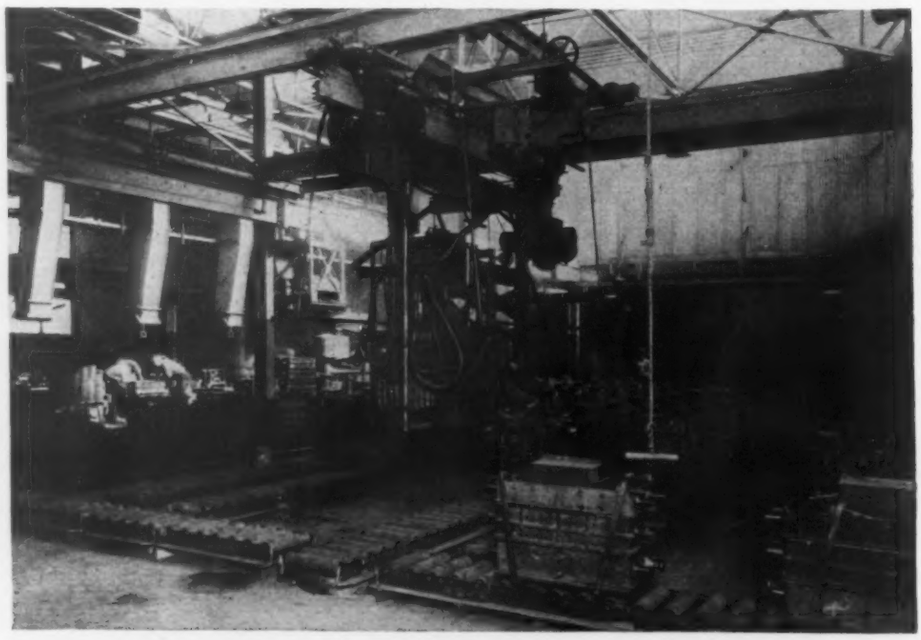


Fig. 9—Hot Metal Ladle Crane for Delivering Metal To and Pouring Castings On the Cylinder Floor of the Cadillac Motor Car Co.'s Foundry

Forecasting a Business

How One Company Predicts Sales from Six Months to a Year in Advance—Method Applicable to Many Lines of Business

BY G. K. SIMONDS* AND JOHN G. THOMPSON**

OF predictions and the making of predictions regarding business conditions, there is no end. Unfortunately, most of the forecasts available to the public relate to that somewhat vague and indefinable thing called "general business." And since the reactions of any particular company do not necessarily synchronize with the swings of the general business cycle, executives are often at a loss to make use of the vast amount of statistical data which is now at their disposal. THE IRON AGE *believes that its readers will welcome this description of a practical method of forecasting sales for the individual concern by means of statistics readily available. The method here outlined has been in successful and profitable use for some time: that it could be applied (with changes which will suggest themselves to the reader) to many other lines of business, seems apparent.*

SINCE the war business men have developed a new attitude toward business forecasting. Much study has been devoted to the business cycle and to its consequences. Several efficient organizations now offer the results of their studies and point out their opinion of what is ahead of business at any particular time. They "forecast business" and some of them have been remarkably successful.

The executives of the Simonds Saw & Steel Co., Fitchburg, Mass., were long ago sold on the idea that the future of "business" and also of "a business" could be foreseen more or less clearly, granting that no totally unexpected and powerful factors appeared. An unexpected war, widespread strikes, or any natural catastrophe such as an earthquake, fire, flood, pestilence, or crop destruction might, and probably would, upset the most intelligent forecast.

But assuming that no such factor entered to disturb the progress of business, we have been and are sold on the theory that the future both of "business" and of "a business" is determined by factors usually arising in the past and acting in the present, and that this action and its results are according to economic law, which both economists and business men are coming to understand better.

So we set out to discover the factors that most strongly affected our future sales, assuming the business to be conducted with undiminished ability, energy and push for increased sales, greater service and larger profits.

We accepted at once the theory of the business cycle, i.e., that business has its good and bad times, the latter developing from conditions that arise during prosperity and properity similarly developing from conditions created by business depression.

We perceived at once that business and speculation both increased in volume as the supply of credit became greater, or to put it in another way, as credit became cheaper.

We investigated to determine how much time elapsed after a turn upward or downward in the trend of the amount of available credit before the new trend affected our sales and how long before the change affected speculation.

We investigated to see if the trend of speculation had an influence upon our sales and if so how soon after a change in the trend of speculation the effect was felt.

Two Basic Factors

THESE two factors, the amount of credit and the volume and kind of speculation, we accepted as affecting both general business and the sales of our own company. We estimated that under normal conditions of credit a change in the trend of credit affected speculation in from one to four months and our sales in from 12 to 15 months. Under similar conditions a change in the trend of speculation affected our sales in from 9 to 12 months. We estimated also that speculation and credit affected general business in practically the same manner and after practically the same length of time.

Of course credit may affect business according to conditions in anywhere from three to 18 months and speculation over a similar period. Our studies referred to the effect on our sales since the war. The statements in this paragraph apply only to business since the establishment of the Federal Reserve system. Prior to that time both speculation and credit ran a wild course in the United States. The effect of these changes upon the volume of business was very uncertain.

When the volume of credit was abnormally small and the trend was downward we found that a change to an upward turn had a greater effect upon sales and speculation and its effect was felt sooner than under normal or nearly normal conditions.

When the volume of credit was abnormally large and the trend was upward we found that a change to a downward turn had less effect upon sales and speculation and its effect was not felt as soon as under normal or nearly normal conditions.

Credit is more reliable than speculation as a business forecaster. We are convinced that this is true of our business and that it is probably true of business in general.

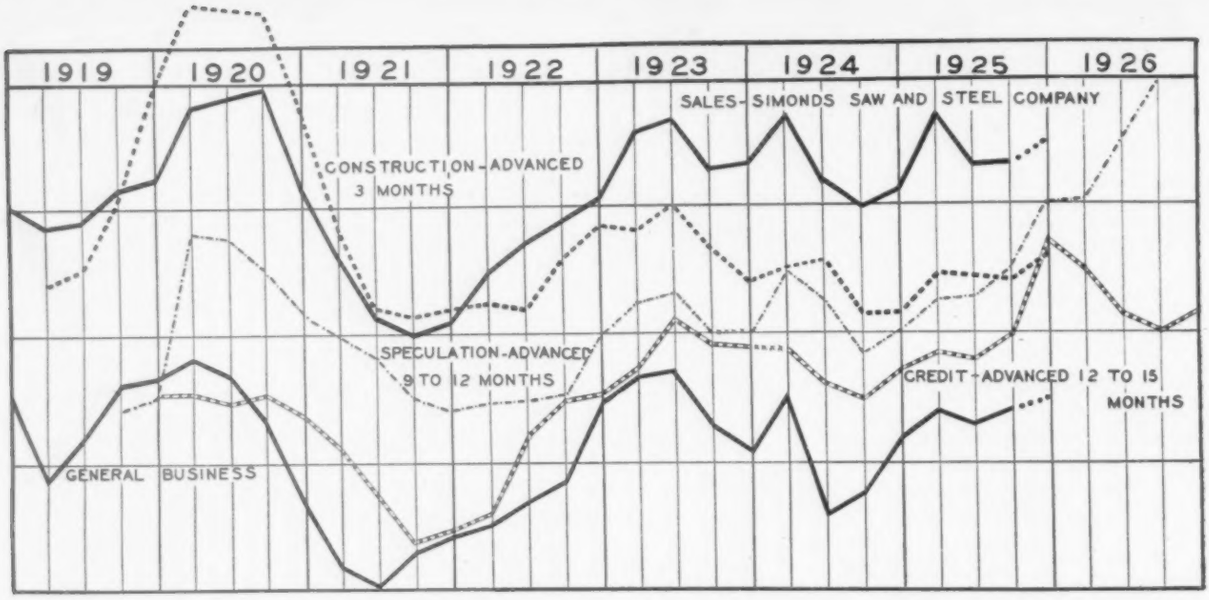
We accepted the volume of credit (or money rates reversed) as a forecaster of our sales, its effect being felt from 12 to 15 months after a definite turn in the trend of credit volume.

We accepted speculation as a forecaster of our sales, its effect being felt from 9 to 12 months after a definite turn in the trend of speculation.

Some lines of business feel the change from prosperity to depression before others; the same is true when depression changes to prosperity. Certain lines of business are fortunate in being warned by the movement in other lines. Ous business is one of them.

*General manager, Simonds Saw & Steel Co., Fitchburg, Mass.

**Assistant to the President, Simonds Saw & Steel Co., Fitchburg.



In This Sales Forecasting Chart Used by the Simonds Saw & Steel Co., the Credit Curve Is Advanced 15 Months, the Speculative Factor 12 Months and the Construction Forecaster 3 Months Ahead of the Period Actually Represented by the Curves

The Simonds Saw & Steel Co. manufactures and sells all kinds of saws for cutting trees, logs and lumber. These lines constitute more than one-half of our business. We also manufacture and sell all kinds of metal cutting saws, hacksaws and files, and machine knives. We make our own steel and certain high grade steels for sale to others.

The Construction Factor

FOR definite forecasters of our particular business, we turned therefore to the volume of building contracts awarded as reported by the F. W. Dodge Corporation, and to the unfilled orders of the United States Steel Corporation. In periods of considerable change in commodity prices, these factors must be adjusted according to the change in prices, for our sales are charted in dollars and not in tonnage. We worked out what we call a Construction Forecaster combining these two factors. This forecasts our sales by from two to four months, averaging about three months.

We have now three forecasters, credit (12 to 15 months); speculation (9 to 12 months), construction (2 to 4 months).

The ordinary way to chart our sales and these forecasters would be to plot them as moving curves and to look ahead; for illustration, from any point when the volume of credit began to decrease we might forecast that in from 12 to 15 months our sales would show a falling off; from any point of change of trend in the curve of speculation we might look ahead 9 to 12 months and forecast that at that time our sales would change in the same direction; we might look ahead from two to four months in using construction as a forecaster.

Change in Period of Influence

BY doing this, however, we found that from the beginning of 1919 to the end of 1923, speculation forecast the trend of our sales by quarters 9 months in advance and for the same five years credit forecast our sales by quarters 12 months in advance; that for 1924 and 1925, speculation forecast the trend of our sales by quarters 12 months in advance and credit 15 months in advance. We are plotting it this latter way for 1926.

We believe this retardation in the effect of credit and speculation on business was caused by the arbitrary interference with the upward swing of business in the spring of 1923 by officials in Washington and by the American Construction Council in New York. A repetition of the boom of 1920 was feared with all its distressing aftermath of 1921. The arbitrary interference was probably helpful in the long run but it doubtless delayed the effect of the credit and speculation factors.

In the accompanying chart the sales of the Simonds Saw & Steel Co. are shown by quarters. Credit, speculation and construction are also shown by quarters; but up to the end of 1923, credit is charted 12 months ahead of the period in which it actually occurred; speculation, 9 months ahead; and construction, three months ahead. Thus the turn upward in credit which appears on the chart in the last quarter of 1921 actually occurred in the last quarter of 1920. Its effect upon our sales was not felt until the last quarter of 1921 and it is charted, not where it occurred, but where its actual effect was felt. The same plan is followed with the other forecasters as indicated on the chart. Since 1923, credit is advanced 15 months and speculation 12 months. *The forecasters are considered as showing only the direction of a change in the amount of sales and not the exact or approximate amount that sales are to be less or greater.*

Works Out in Practice

ON Jan. 10, 1925, the day of the publication of the unfilled steel orders for the last quarter of 1924, we were able to calculate our Construction Forecaster for the first quarter of 1925. On that day the chart then showed by credit, speculation and construction that we should have for the first quarter of 1925 an increase in sales over the last quarter of 1924. Credit and speculation showed a change downward for the second quarter, an advance in the third quarter and another advance in the fourth quarter. On April 10, construction indicated a slight fall for the second quarter; on July 10, a slight fall for the third quarter; and on Oct. 10, an advance for the fourth quarter. *Our sales for* 1925 *have followed the forecasters almost exactly.* Although the forecast was for a different run of business in 1925 from that of any other year since the war, we believed at the beginning of the year that the forecast was correct and planned accordingly.

Our sales are only slightly seasonal. There is usually a slight falling off in mid-summer and in November and December. For the last four years our first quarter each year has been larger than the quarter preceding, but this has also been true of general business.

During the six years (24 quarters) 1920-1925 inclusive, all three forecasters have, in 15 quarters, pointed in the same direction and in 14 of these Simonds Saw & Steel Co. sales have gone in the direction indicated. The single exception occurred at the top of the boom of 1920 when our sales did not turn down until six months after general business which agreed in trend with the forecasters.

During the same years, 1920-1925, in 7 other quarters our sales moved in the direction indicated by

credit, making the credit indicator correct for 22 out of 24 quarters. The two quarters when the forecast was incorrect for our sales were the second of 1920 and the first of 1924. The first of these was at the peak of the 1920 boom and although *our* sales did not follow credit for that quarter, general business did. All three forecasters in this quarter pointed to falling sales. Our sales increased only slightly. The second of these variations was the first quarter of 1924. Credit was almost stationary and its normal effect had been halted by the arbitrary interference previously referred to. Both our sales and general business moved up in this quarter.

Credit has been correct 22 out of a possible 24 quarters; speculation 20 out of a possible 24; and construction 17 out of a possible 24. All three have failed in the same quarter to forecast our sales but once in a possible 24, at the top of the 1920 boom as explained above.

Speculation failed four times to forecast our sales —twice at the peak of the boom when general business and speculation agreed, once at the turn from the depression of 1921 and once in 1925 which should hardly be called a failure, as the chart shows.

Construction failed to forecast our sales 7 times —twice at the peak of the boom of 1920, when general business and construction agreed, twice in the irregular year of 1923, once because of strikes in 1922, once in 1924, and once in 1925 which also can hardly be called a failure (see chart).

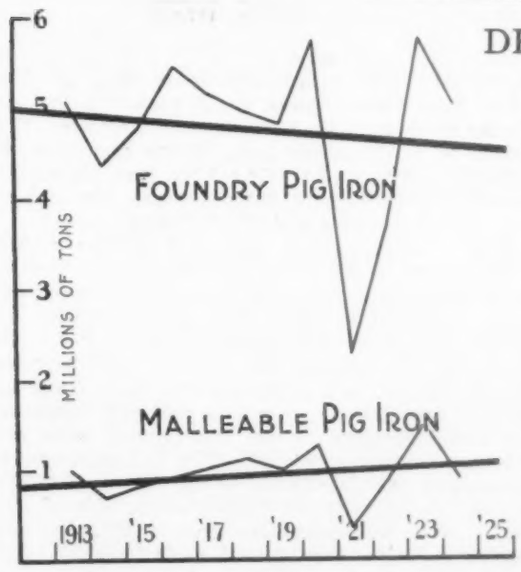
Many Changes in Method

WE consider our chart for forecasting the sales of the Simonds Saw & Steel Co. as we have developed it only in the rough as yet. Many refinements have already suggested themselves. We call it to the attention of others, not experts, working along the same line of endeavor because of its simplicity and its clearness to the non-expert in the form in which it is shown. If any prefer the continuous curves with the forecasters placed as they actually occur in time, it is comparatively easy to redraw it in that manner. Of course movements in any of the factors used do not adjust themselves exactly to quarters of a year. Even the movement of the earth around the sun does not adjust itself exactly to our year of 365 days and men have to correct the adjustment one year in four and also one year in four hundred. At the bottom of the chart, we show the line of general business. Note how nearly the sales of the Simonds Saw & Steel Co. parallel it.

Higher Sales for First Quarter

FOR 1926 the forecasters apparently do not assist us in making forecasts of our sales as far ahead and as definitely as they did in 1925. The construction forecaster for the first quarter of 1926 will doubtless show a rise over that for the last quarter of 1925. With speculation also rising slightly and the turn downward in credit coming from an abnormally high point, our sales for the first quarter of 1926 will at least equal those of the last quarter of 1925. We expect our sales to move higher.

The forecast for the second and third quarters cannot well be decided until the beginning of each quarter when the construction factor can be determined. From what evidence we have now, it seems likely that we shall have declining sales for the second and third quarters and probably for the fourth, but the turn downward in sales may not come until the middle of the year. For the first time in seven years, speculation as a forecaster has followed a rising trend for several months, with credit as a forecaster at the same time on the downward trend. In this connection it is of interest to note that on our chart in the first quarter of 1920 speculation and construction rose while credit did not. Our sales and general business both rose. Again in the first quarter of 1924 speculation and construction rose while credit did not and again our sales and general business both rose. This may be repeated in the second quarter of 1926.



DECREASING OUTPUT OF FOUNDRY PIG IRON

What Production Shows as to Consumption

34,000 *Tons Less Every Year of Foundry Iron*
14,500 *Tons More Every Year of Malleable Iron*

THE production of foundry pig iron for the gray iron industry shows a gradual decline, in the face of an increasing population and the general increasing consumption of steel and iron generally. The trend line in the accompanying diagram points downward and shows that consumption is apparently decreasing at a rate of 34,000 tons per annum.

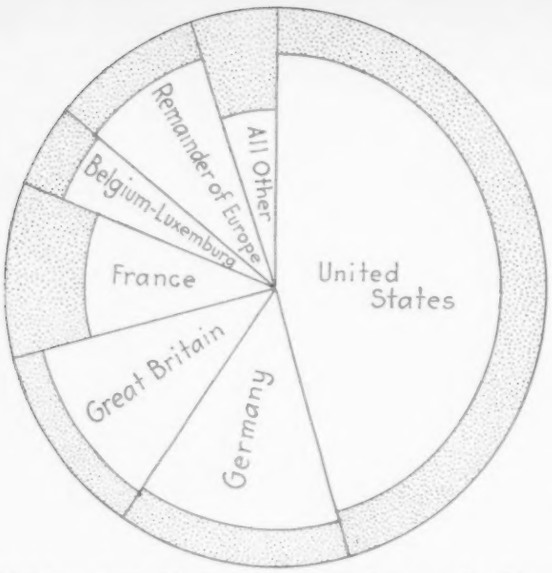
This consumption is measured in terms of production. The production figures are those covering foundry pig iron reported by the American Iron and Steel Institute as foundry iron made for sale, and therefore do not include some of the iron which goes into cast iron pipe or is converted into castings by the makers of the pig iron.

These figures of "made for sale" are available for 12 years, beginning with 1913. They indicate that the normal consumption was about 5,000,000 tons in 1912 and dropped off to 4,592,000 in 1924, or a loss of over 8 per cent.

Corresponding to the foundry pig iron consumption trend is shown also the trend of consumption of malleable pig iron. This likewise covers malleable pig iron made for sale, and shows an upward trend at the rate of 14,500 tons increase per annum. Thus since 1912 there has been an increase in the annual consumption of 172,000 tons. That is, the apparent consumption in 1912, say, was 856,000 tons, while in 1924 it was 1,028,000 tons, or an increase of 20 per cent.

A corresponding study of the total production of foundry pig iron and of malleable pig iron, (including iron made for sale and iron utilized by the pig iron makers) shows for the 12 years that while the foundry iron trend was upward, it was not upward to the same degree as that of the malleable iron. Thus, the trend of consumption for the foundry iron figures out at 10,000 tons increase every year, and for malleable iron at 27,500 tons per annum. In this period the annual consumption works out as 2½ per cent higher in 1924 than in 1912 in the case of foundry iron, but 40 per cent in the case of malleable iron.

The trend lines in all cases have been obtained mathematically, so that the total consumption over the period (on the basis of the trend line) is equal to the total of the various outputs of those same years.



Division of World Capacity Shown by Angular Lines. The white portion indicates greatest use which has been made of that capacity (Pig Iron)

World Iron and

Equipment for 108,000,000 Tons of Pig Iron, Subdivided About as Shown at Left

BY SIDNEY G. KOON

NO good definition of capacity for producing pig iron or steel has yet been given. Figures for individual plants vary from exceedingly conservative estimates to the flamboyant prognostications of promoters. It is necessary in such case to do a lot of reading between the lines in arriving at a satisfactory figure.

Especially difficult is the task of obtaining a real working figure for other countries. In some cases we have a good gage on the capacity of the country through noting its production in its biggest year and allowing for the inevitable percentage of idle equipment. For many of the smaller countries, however, even this approximate measure is lacking and estimates have to be relied upon.

Working on the theory that a country's largest production (other data being lacking) is between 80 and 90 per cent of its real capacity, and with certain adjustments for countries where more definite information is available, the accompanying table has been prepared. Some of the figures given are considerably at variance with current figures which have been published elsewhere. For example, the pig iron capacity of the United States is stated at 49,000,000 tons, whereas 54,000,000 tons is reported by the American Iron and Steel Institute. This includes a number of furnaces either scheduled for dismantling or otherwise definitely abandoned.

Similarly, we have taken 56,000,000 tons for steel ingots and castings, of which 54,000,000 tons may be considered to represent ingots and 2,000,000 tons castings. In this case, the capacity figures of the institute are more than 61,000,000 tons. That this is an overestimate is the opinion of many able steel men. As a matter of fact, the United States never reached 75 per cent of that tonnage in any one year and it is improbable that the best year on record, when efforts were made for high tonnage, would be below 80 or 85 per cent of capacity.

Capacity of European Countries

In a paper before the third congress of the International Chamber of Commerce, held in Brussels last June, Sir Arthur Balfour placed the capacity of Great Britain at 12,000,000 tons for pig iron and 12,000,000 tons for steel. These figures look reasonable. In the same paper he gave the capacity in France as 11,000,000 tons of pig iron and 10,000,000 tons of steel—again a set of satisfactory figures for pig iron, but the steel has been placed at 9,750,000 tons. For Belgium he gave 3,250,000 tons for pig iron and the same amount for steel, while for Luxemburg the figures were 2,800,000 tons of pig iron and 2,250,000 tons of steel. The Luxemburg figures may be accepted but those for Belgium probably are too low. We have placed each at 3,500,000 tons. His figures for the United States were 52,700,000 tons for pig iron and 59,000,000 tons for steel, which were the American Iron and Steel Institute's figures of a year ago.

For Germany Sir Arthur Balfour gave 12,000,000 tons for pig iron and 14,000,000 tons for steel. There is reason to believe that both figures are under-estimates. When it comes to pig iron it must be remembered that in 1913 Germany produced no less than 19,309,000 tons. Of this amount Luxemburg, at that time included in the German statistics, accounted for 2,548,000 tons. A further large tonnage, no longer in the German list, was that of Alsace-Lorraine, which accounted for 3,864,000 tons of pig iron. Thus in 1913 the production of what is now German territory was a little under 13,000,000 tons.

Evidently a capacity figure of 12,000,000 tons is altogether too low, particularly when we take into account the large amount of rehabilitation which was going on in Germany during the period of inflation of the currency, that is, particularly in 1923 and 1924. In THE IRON AGE of March 12, on page 764, the daily capacity of German blast furnaces in December, 1923, is given as 40,860 metric tons. Using this figure for the full 365 days, we have 14,914,000 tons. It appears reasonable, therefore, to quote German pig iron capacity in round figures at 15,000,000 tons.

Summary of Capacity and Maximum Production
(Thousands of Tons)

	Pig Iron	Steel	Pig Iron	Steel
United States	49,000	56,000	40,361	45,061
Germany	15,000	17,000	12,897	15,312
Great Britain	12,000	12,000	10,484	9,554
France	11,000	9,750	7,657	6,907
Belgium and Luxemburg	6,300	5,750	5,329	4,666
Rest of Europe	9,650	11,600	8,190	8,839
Rest of World	5,050	4,900	3,174	3,187
	108,000	117,000		

When it comes to steel ingots and castings we have a different story. Sir Arthur Balfour gave 14,000,000 tons as the German capacity. The largest recent production was that of 1922, with 11,720,000 tons. In 1925 the total is likely to reach 12,800,000 tons. Also the combined steel quotas (see page 509, THE IRON AGE, Feb. 12) of the Steel Manufacturers' Association are 13,500,000 tons. The secretary of that association and other German estimators feel that some of these estimates are altogether too low. The full steel production capacity was placed early in the year at 17,000,000 tons. While this may err a little on the side of optimism, it must be remembered that in 1913 Germany produced 15,312,472 tons of steel, aside from the 1,336,263 tons made in Luxemburg and the 2,286,354 tons of Alsace-Lorraine, a total of 18,935,089 tons.

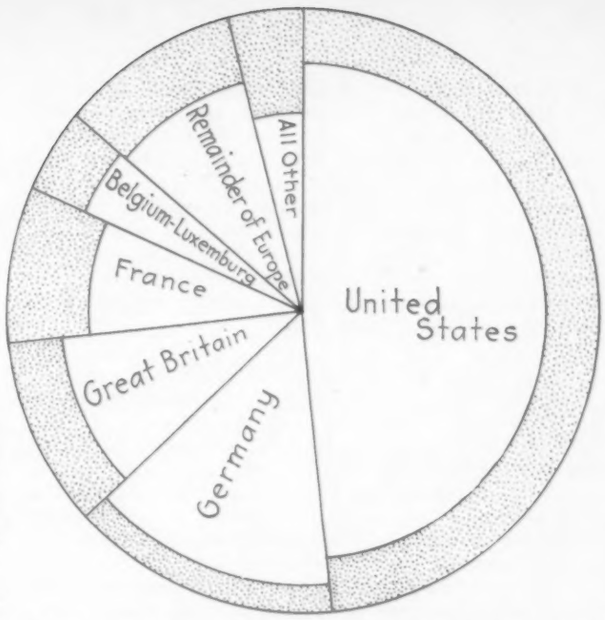
Other European Countries

Aside from the countries already mentioned, Russia was formerly by far the largest iron and steel producer. In 1913 there were 4,637,300 tons of pig iron and 4,269,200 tons of steel made in Russia. This included something more than 1,000,000 tons of pig iron and 1,600,000 tons of steel turned out in what now constitutes the Republic of Poland. How much deterioration, if not actual destruction, the Russian plants have suffered since the revolution we are unable to say. Taking out the Polish production, however, we may not be far afield in estimating Russian potential capacity at 3,500,000 tons of pig iron and the same amount of steel.

Next came the Austro-Hungarian Empire which, in

Steel Capacity

Equipment for 117,000,000 Tons of Ingots and Castings, Subdivided as Shown at Right



Division of World Capacity Shown by Angular Lines. The white portion indicates greatest use which has been made of that capacity (Steel)

1916, produced 2,380,000 tons of pig iron and 3,278,000 tons of steel. The iron and steel capacity of the old Hapsburg dominions has been split among Austria, Hungary, Czecho-Slovakia and Roumania. The latter country is estimated to have acquired 260,000 tons capacity for pig iron and 150,000 tons for steel through cession of territory formerly in Hungary.

None of the three residuary legatees of the old empire has made much of a record in production of iron and steel since the war. Czecho-Slovakia has done by far the best, with 1,050,000 tons of pig iron and 1,350,000 tons of steel in 1924. Austria's best year also was 1924, with 384,000 tons of pig iron and 541,000 tons of steel. Hungary in 1923 produced 295,000 tons of pig iron and 283,000 tons of steel. Using these figures as a rough basis for the subdivision of what must have been the iron and steel capacity in 1914, the figures for Austria, Hungary and Czecho-Slovakia are given in the table.

Poland in 1913 was credited with 1,031,000 tons of pig iron and 1,649,000 tons of steel. It is entirely reasonable to credit that country with capacity for 1,200,000 tons of pig iron and 1,800,000 tons of steel, with the thought that some of this capacity may have been destroyed during the War. Roumania, including the capacity acquired from Hungary, may be said to have pig iron making equipment capable of producing about 350,000 tons and steel equipment for 250,000 tons.

Italian steel production always has run far ahead of pig iron. Cheap electric current and the use of the electric furnace for steel, together with almost a total absence of fuel for smelting ores, accounts for the difference. In 1917 Italy made 497,000 tons of pig iron and 1,311,000 tons of steel. We have credited Italy with 600,000 tons capacity for pig iron and with 1,600,000 tons for steel. Spain in 1916 made 498,000 tons of pig iron and in 1917 made 470,000 tons of steel. Apparently 600,000 tons of capacity under each heading may be considered fair. Sweden in 1917 made 829,000 tons of pig iron and in 1916 made 614,000 tons of steel. Capacity figures of 1,000,000 tons for pig iron and 750,000 tons for steel appear reasonable.

Holland's new furnace is expected to produce from 100,000 to 125,000 tons of iron per year.

From the figures given above and in the table, the

Iron and Steel of the World

	Capacity to Produce		*Largest Production Ever Made*			
	Pig Iron	Steel Ingots and Castings	Pig Iron	Year	Steel	Year
United States	49,000,000	56,000,000	40,361,146	1923	45,060,607	1917
Canada	1,300,000	1,900,000	1,107,000	1918	1,695,000	1918
Mexico	300,000	300,000	.....		.....	
North America	50,600,000	58,200,000				
Great Britain	12,000,000	12,000,000	10,481,917	1913	9,553,715	1917
Germany	15,000,000	17,000,000	19,309,172*	1913	18,935,089*	1913
France	11,000,000	9,750,000	7,656,939	1924	6,906,502†	1924
Belgium	3,500,000	3,500,000	2,781,000	1924	2,780,000	1924
Luxemburg	2,800,000	2,250,000	2,547,861	1913	1,886,084	1924
Holland	100,000	.....	.....		.....	
Northwest Europe	44,400,000	44,500,000				
Russia	3,500,000	3,500,000	4,637,300(a)	1913	4,769,200(a)	1913
Poland	1,200,000	1,800,000	1,031,123	1913	1,648,533	1913
Roumania	350,000	250,000	.....		.....	
Austria	600,000	900,000	384,000‡	1924	541,000‡	1924
Hungary	400,000	400,000	295,000‡	1923	283,046‡	1923
Czecho-Slovakia	1,300,000	1,800,000	1,050,000‡	1924	1,350,000‡	1924
Italy	600,000	1,600,000	497,000	1917	1,311,000	1917
Spain	600,000	600,000	497,726	1916	470,241	1917
Sweden	1,000,000	750,000	828,969	1917	614,111	1916
Europe	53,950,000	56,100,000				
Japan	1,200,000	1,500,000	780,000	1919	845,036	1920
China	950,000	400,000	257,648	1920	120,000	1922
India	800,000	350,000	613,627	1923	215,465	1923
Australia	500,000	400,000	416,050	1924	284,669**	1924
South Africa	.....	50,000	.....		27,064	1923
The World	108,000,000	117,000,000	77,536,000	1913	80,308,000	1917

*Includes both Luxemburg and Alsace-Lorraine; 1913 pig iron production of Luxemburg (2,547,861 tons) and of Alsace-Lorraine (3,864,000 tons), deducted from the reported figure, leaves 12,897,311 tons for Germany. Similarly, for steel, deducting the 1,336,263 tons of Luxemburg and 2,286,354 tons of Alsace-Lorraine leaves 15,312,472 tons for Germany.

†Ingots only.

‡Austria-Hungary in 1916 produced 2,380,000 tons of pig iron and 3,278,000 tons of steel.

**One plant only.

(a)Includes production of Poland.

pig iron capacity of Europe may be placed at 53,950,000 tons per year. No distinction has been made between metric tons and gross tons, because the conversion factor (1.6 per cent) represents a difference much smaller than the probable errors in our estimates. Similarly, the European capacity for steel ingots and castings is placed at 56,100,000 tons. For steel, the United States appears to have almost identically the same capacity as all of Europe. For pig iron, the European capacity is placed at about 10 per cent more than that of the United States.

The Rest of the World

During the stress of the War, Canada produced 1,107,000 tons of pig iron and 1,695,000 tons of steel, both in 1918. Capacity at 1,300,000 tons and 1,900,000 tons, respectively, seems reasonable. For Mexico, merely an estimate has been made of 300,000 tons in each column. This results in giving North America 50,600,000 tons of pig iron capacity and 58,200,000 tons of steel capacity.

Japan has been slow to give out information along these lines. However, an article on page 1658 of THE IRON AGE, Dec. 20, 1923, translated from *Stahl und Eisen*, shows the completed plant capacity of the various Japanese companies at 1,170,000 tons for pig iron and 1,430,000 tons for steel. Estimates in our table are 1,200,000 tons and 1,500,000 tons respectively. China has a maximum pig iron capacity of 947,000 tons, according to a paper read before the American Iron and Steel Institute in 1923 and abstracted on page 1247 of our issue for Nov. 8 of that year. The amount has been made 950,000 tons as a "round" figure in our table. This checks fairly closely with the estimate of another investigator, shown at page 463 of our issue of Aug. 23, 1923, where 840,000 tons per year at 90 per cent of full operation would indicate a probable capacity of 933,000 tons.

India produced 613,627 tons of pig iron in 1923 and 215,465 tons of steel. The estimated capacity for these products is given as 850,000 and 350,000 tons respectively. Australia produced 416,000 tons of pig iron last year, and the principal Australian steel company turned out 285,000 tons of steel. Our estimates for the two products are 500,000 and 400,000 tons respectively. South Africa made 27,064 tons of steel in 1923. The estimate is 50,000 tons capacity.

The United States Proportion of Total

With 49,000,000 tons, the proportion of the United States in the total pig iron capacity of the world (estimated at 108,000,000 tons) figures out about 45 per cent. Similarly, with steel, the 56,000,000-ton capacity of the United States represents nearly 48 per cent of the 117,000,000-ton world capacity.

Railroad Equipment Buying

THE railroads of the United States during the year ordered 78,169 freight cars, according to records compiled by the American Railway Car Institute, 61 Broadway, New York. *Railway Age* has added to this figure 14,000 cars which railroads apportioned to their own shops, making a total in excess of 92,000.

Some of the cars ordered in 1924 were not delivered until 1925, so that the number of cars built and delivered in 1925, exclusive of those built by the railroads in their own shops, totaled about 94,000. The number of freight cars delivered in 1924 was 104,093, while the numbered order in that year was 135,682.

Figuring 12 tons of steel to the car, including wheels and axles, the total steel consumption for new cars would be 1,128,000 net tons. In addition to new cars the cars repaired totaled about 13,500. The average amount of steel per car being estimated at five tons, there is a total of 1,195,500 tons of steel used by the car builders. The car repairs ordered during the year reached a higher figure, 22,871, but some of this work will go over into this year.

Following is a table showing the number of freight cars delivered and ordered by months in 1925:

Freight Cars Delivered 1925		Freight Cars Ordered 1925
Jan.	10,463	9,129
Feb.	12,486	5,234
Mar.	13,097	4,702
Apr.	11,598	5,967
May	9,416	7,077
June	9,942	858
July	7,122	557
Aug.	5,661	3,013
Sept.	5,866	8,084
Oct.	2,790	7,478
Nov.	2,649	13,310
Dec.	2,910*	12,760
Total,	94,000	Total, 78,169

*Estimated.

In addition to the above, about 3000 cars were delivered on export orders and 1485 cars for export were contracted for.

The number of car repairs delivered and ordered by months was as follows:

Car Repairs Delivered		Car Repairs Ordered
804	Jan.	1,895
632	Feb.	1,356
1,063	Mar.	1,254
1,478	Apr.	57
541	May	3,265
644	June	1,197
1,415	July	3,124
1,900	Aug.	698
1,895	Sept.	1,058
1,396	Oct.	7,650
971	Nov.	1,276
761*	Dec.	41
Total, 13,500	Total,	22,871

*Estimated.

Passenger cars delivered totaled 1100; passenger cars ordered, 1691. Street railroad cars delivered, 850; ordered, 525. Subway and interurban cars delivered, 525; ordered, 295.

Locomotive Orders Very Small

Locomotives ordered for domestic service in 1925 totaled 1055, according to *Railway Age*. This compared with 1413 in 1924, 1944 in 1923 and 2600 in 1922. It was the third successive year in which there has been a substantial decrease in locomotive orders from the year preceding. The 1925 total was the smallest for any year in the present century with the exception of the subnormal years of 1919 and 1921.

Railroad equipment purchases were below expectations and also below the forecasts made at the beginning of the year. The excellent performance of the roads in the handling of a heavy freight traffic left little doubt that some of the estimates as to the amount of new rolling stock the roads need each year may require revision. For example, the Railway Car Manufacturers' Association, the predecessor of the American Railway Car Institute, published a booklet in 1924 entitled, "A Forecast of the Volume of New Freight Car Construction," in which the conclusion was reached that in the period from 1924 to 1930, inclusive, the railroads of the United States should purchase annually 226,000 new freight cars. They have not approached this figure in many years.

November Business in Steel Furniture

WASHINGTON, Jan. 2.—Orders to the value of $1,975,117 were received in November for steel furniture by the business group, according to the Department of Commerce, whose estimate is based on reports of 32 companies in this group. Shipments were valued at $1,885,505 and unfilled orders at $1,496,242. Both orders and shipments showed declines under October. In the shelving group, November orders were valued at $686,814, based upon reports from 15 companies. Shipments were valued at $575,905 and unfilled orders at $739,831. In this group also November orders and shipments were less than those for October.

The National Mfg. & Plating Co., Detroit Savings Bank Building, Detroit, expects soon to move into larger manufacturing quarters and will employ 30 workmen. The company manufactures sheet metal stampings, forgings, die castings, brass and bronze castings and specializes in parts that require plating and polishing.

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World's Pig Iron and Steel Output

Seven Post-War Years Compared with 1913—Only Steel Output Larger Than Pre-War—Exports Close to 1913

BY EDWIN F. CONE*

A NEW record was made by the steel production of the world in 1925, but in pig iron and in combined exports the totals still fell short of those for 1913. Using the records of the six leading producing nations, the steel output last year was 11.8 per cent in excess of 1924 and 16.4 per cent greater than that of 1913. Again, the American steel industry was the dominant factor in production, making 60 per cent of the total steel and 55.5 per cent of the pig iron, again exceeding its 1913 proportions.

For the seventh time the prophecy, made at the close of the war, that a great peace-time demand from so-called neutral nations would compensate for four years of a postponement of all but war needs, has failed. The total was, however, larger than for any of the seven years and closely approached that of 1913. The American exports last year ranked sixth and were the smallest since the war.

New records were made by France last year. The revival of the German industry was a feature. Only two countries now produce more pig iron than steel—France and Belgium.

Output and Exports of the Six Leading Countries

SIX countries produce the great bulk of the pig iron and steel of the world: the United States, Great Britain, Germany, France, Belgium and Luxemburg. In the following paragraphs a review of the pig iron and steel output, as well as the exports, of those six countries is presented. The data are largely those collected by the National Federation of Iron and Steel Manufacturers of Great Britain. Steel output includes steel castings in all the tables, but in the figures for exports, scrap is not included.

Heavy Output in France

As in 1924, so again in 1925, the record of the French industry is the outstanding feature. In 1924 the French pig iron production surpassed the British for the first time; last year, however, both in pig iron and steel this was true.

A new record was also made last year in the total pig iron and steel output of that country. With a production of 8,323,100 gross tons of pig iron in 1925, as shown by the table, the increase over 1913 was over 62 per cent; in steel the expansion was about 60 per cent. The war acquisition of Alsace-Lorraine, of course, has made this possible, the steel industry of that section contributing probably 35 to 40 per cent of these totals.

In exports a notable volume was made. At 3,711,500 tons last year the French were practically equal to the British for the first time in history and ranked second among the six nations. The total was almost seven-fold that of 1913, when France was hardly a factor in world iron and steel trade.

New Post-War Records in Luxemburg

Luxemburg ranks next to France in achievements last year. The 1925 pig iron output was also larger than the previous year, but still less than in 1913. Steel production established a new peak. An interesting fact is that the pig iron and steel production of this small country is but little less than that of Belgium.

No data concerning Luxemburg's exports are available because they are combined with those of Belgium, due to an economic union established in 1922.

Revival in Germany

For the first time since the war, official data covering Germany's pig iron and steel production were made public last year. A dependable survey is, therefore, now possible. The volume last year is the feature. The output of both pig iron and steel was the largest since the war. For the third time the pig iron output was second only to that of the United States; in steel this was true for the fourth year. Despite the rapidly expanding volume, its proportion of the total production of the six countries is not so large as it was in 1913.

German exports in 1925 gained rapidly. The table shows that, at 3,031,200 tons, the volume was nearly double that of 1924 and larger than any year since the war. It was still less than half that of 1913.

The American Industry

The feature last year was the new record in steel production. With December estimated, the 45,250,000 tons of ingots and castings surpassed by about 500,000 tons the best previous volume made in 1917, war year. In pig iron the table shows that the 36,750 tons for 1925, with December estimated, was third during the years since the war. It was sixth, if the war years are included. The spread last year of nearly 9,000,000 tons between steel and pig iron was due largely to the in-

*Associate editor THE IRON AGE.

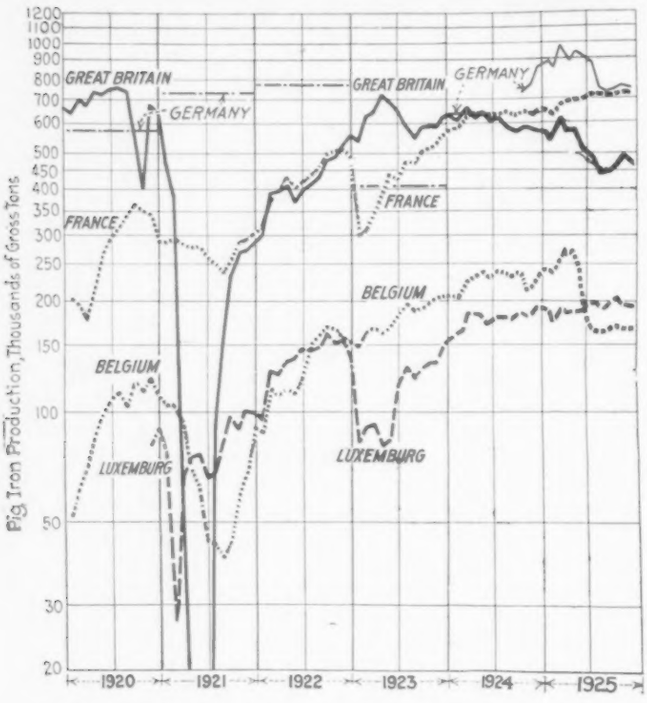
SEVEN years after the war the steel consumption of the non-steel producing world, as judged by the exports of six nations, is still less than in 1913.

The world's pig iron production in 1925 was still under that of 1913; it has not yet exceeded the pre-war volume.

A new record in steel output was the world achievement of 1925.

American steel production was 60 per cent of the world's total last year with the pig iron 55.5 per cent—both larger shares than in 1913.

A revival in the German industry restores the production of that country to second place for the first time since the war.



Pig Iron Output of Five European Countries in the Last Six Years. The large expansion in France, Germany and Luxemburg in 1925 is a feature

French Iron and Steel Output and Exports During Peace Years in Gross Tons

	Pig Iron	Steel	Exports
1912	4,860,000	4,356,000	498,000
1913	5,124,000	4,620,000	578,400
1919	2,376,000	2,148,000	232,800
1920	3,380,400	3,002,400	928,800
1921	3,363,600	3,054,000	1,605,600
1922	5,146,800	4,464,000	1,936,800
1923	5,347,200	5,029,200	2,182,800
1924	7,502,400	6,792,000	2,773,200
1925*	8,323,100	7,289,700	3,711,500

*Partly estimated

German Iron and Steel Output and Exports During Peace Years in Gross Tons

	Pig Iron	Steel	Exports
1912*	15,350,400	16,075,200	5,788,800
1913*	16,492,800	17,348,400	6,207,600
1919	6,177,400	7,761,800	no data
1920	6,933,600	9,133,200	1,723,200
1921	8,703,800	9,856,600	2,445,600†
1922	9,248,400	11,530,800	2,516,400
1923	4,858,800	6,206,400	1,306,800
1924	7,689,600	9,681,600	1,536,000
1925**	10,046,800	12,176,200	3,031,200

*Excluding Luxemburg except in exports
†Based on 8 months
**Partly estimated

American Iron and Steel Output and Exports During Peace Years in Gross Tons

	Pig Iron	Steel	Exports
1912	29,727,000	31,251,000	2,418,000
1913	30,966,000	31,300,000	2,892,000
1919	31,015,000	34,671,000	4,399,000
1920	36,926,000	42,133,000	4,706,400
1921	16,688,000	19,784,000	2,172,000
1922	27,220,000	35,603,000	1,986,300
1923	40,361,000	44,943,700	1,926,900
1924	31,405,800	37,931,900	1,694,900
1925*	36,750,000	45,250,000	1,662,600

*December estimated

creased use of scrap in steel making. Compared with 1913, the 1925 steel production was 45 per cent larger, but the pig iron was only 18.7 per cent greater.

Poor was the showing in steel exports last year. American sales of only 1,662,600 tons were not only the lowest since the war, but the smallest of the five exporting nations. In fact, each of the other four moved double the American amount. Lower wages, longer hours and depreciated currencies on the continent of Europe injured both American and British exports.

Depression in Great Britain

Depression pervaded the British industry throughout almost the entire year—so much so that the pig iron and steel outputs were both less than in 1924. The decline was more pronounced in steel than in pig iron, as revealed by the tables. The decrease in pig iron last year from 1924 was 15.2 per cent; that of steel was 24.2 per cent. An outstanding fact also is that last year the make of both iron and steel was less than in 1913.

British Iron and Steel Output and Exports During Peace Years in Gross Tons

	Pig Iron	Steel	Exports
1912	8,748,000	6,792,000	4,807,200
1913	10,260,000	7,663,200	4,969,200
1919	7,404,000	7,896,000	2,223,200
1920	8,034,000	9,067,200	3,250,800
1921	2,616,000	3,705,200	1,696,800
1922	4,902,000	5,881,200	3,400,800
1923	7,440,000	8,481,600	4,320,000
1924	7,318,800	8,221,200	3,853,200
1925*	6,207,800	6,136,700	3,711,700

*December estimated

Belgian Iron and Steel Output and Exports During Peace Years in Gross Tons

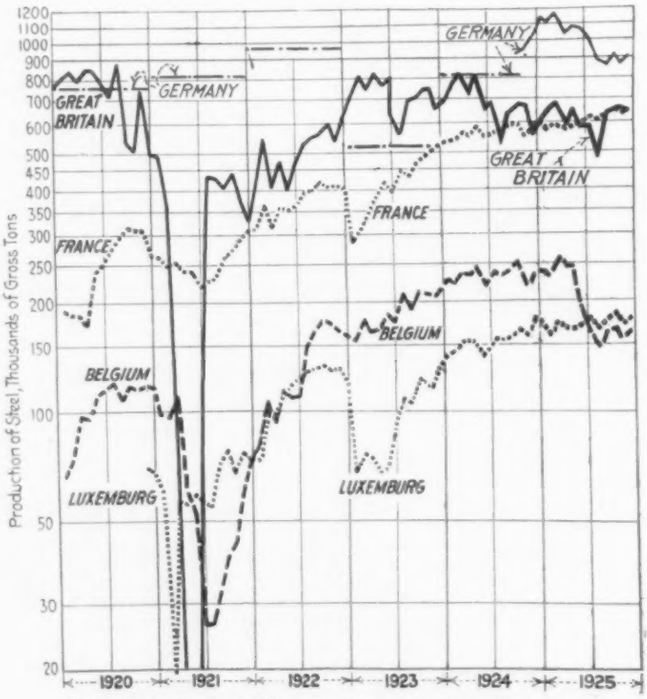
	Pig Iron	Steel	Exports
1912	2,304,000	2,472,000	1,494,000
1913	2,445,600	2,427,600	1,550,400
1919	247,200	328,800	174,000
1920	1,098,000	1,233,600	920,400
1921	861,600	753,600	907,200
1922	1,578,600	1,540,800	2,110,800
1923	2,149,200	2,234,400	2,494,800
1924	2,763,600	2,816,400	3,318,900†
1925*	2,507,400	2,378,800	3,289,600

*Partly estimated
†Final not yet available

Luxemburg's Iron and Steel Output During Peace Years in Gross Tons

	Pig Iron	Steel
1913	2,508,000	1,308,000
1919	608,000	364,000
1920	681,600	560,400
1921	955,200	742,800
1922	1,658,400	1,371,600
1923	1,384,800	1,179,600
1924	2,124,000	1,851,600
1925*	2,307,800	2,053,100

*Partly estimated



Steel Output, Including Castings, of Five European Countries from 1920 to 1925. The expansion of Germany, France and Luxemburg last year stands out

World Production and Exports of Steel and Iron as Represented by the Six Leading Nations, in Gross Tons

Pig Iron:	1913	1920	1921	1922	1923	1924	1925*
United States	30,966,000	36,926,200	16,688,000	27,220,000	40,361,000	31,405,800	36,750,000
Great Britain	10,260,000	8,034,000	2,616,000	4,902,000	7,440,000	7,318,800	6,207,800
Germany	16,492,800	6,933,600	8,703,800	9,248,400	4,858,800	7,689,600	10,046,800
France	5,124,000	3,380,400	3,363,600	5,146,800	5,347,200	7,502,400	8,323,100
Belgium	2,445,600	1,098,000	861,600	1,578,600	2,149,200	2,763,600	2,507,400
Luxemburg	2,508,000	681,600	955,200	1,658,400	1,384,800	2,124,000	2,307,800
Totals	67,796,400	57,053,800	33,188,200	49,754,200	61,541,000	58,804,200	66,142,900
Steel:	1913	1920	1921	1922	1923	1924	1925*
United States	31,300,000	42,133,000	19,784,000	35,603,000	44,943,700	37,931,900	45,250,000
Great Britain	7,663,200	9,067,200	3,705,200	5,881,200	8,481,600	8,221,200	6,136,700
Germany	17,348,400	9,133,200	9,856,600	11,530,800	6,206,400	9,681,600	12,176,200
France	4,620,000	3,002,400	3,054,000	4,464,000	5,029,200	6,792,000	7,289,700
Belgium	2,427,600	1,233,600	753,600	1,540,800	2,234,400	2,816,400	2,378,800
Luxemburg	1,308,000	560,400	742,800	1,371,600	1,179,600	1,851,600	2,053,100
Totals	64,667,200	65,129,800	37,896,200	60,391,400	68,074,900	67,294,700	75,284,500
Exports	1913	1920	1921	1922	1923	1924	1925*
United States	2,892,000	4,706,400	2,172,000	1,986,300	1,926,900	1,694,900	1,662,600
Great Britain	4,969,200	3,250,800	1,696,800	3,400,800	4,320,000	3,853,200	3,711,700
Germany	6,207,600	1,723,200	2,445,600	2,516,400	1,306,800	1,536,000	3,031,200
France	578,400	928,800	1,605,600	1,936,800	2,182,800	2,773,200	3,711,500
Belgium	1,550,400	920,400	907,200	†2,110,800	†2,494,800	†3,318,900	†3,289,600
Totals	16,197,600	11,529,600	8,827,200	11,951,100	12,231,300	13,176,200	15,406,600

*Estimated in part. †Includes Luxemburg.

A poor record was also made in exports last year—the 3,853,200 tons was nearly 500,000 tons less than in 1924 and only about 450,000 tons in excess of those of 1923. Continental competition was the chief obstacle, principally from Belgium and France. In no year since the war have the British exports reached the volume of 1913, the nearest approach having been in 1923 at 86.9 per cent of that total.

In both pig iron and steel production the Belgian record in 1925 showed a falling off from 1924. Until June, 1925, the volume was distinctly larger than in 1924, but there was a decided slump from then on to the year's end, caused by strikes and unfavorable economic conditions. As revealed by the table, pig iron last year was about 260,000 tons less than in 1924, with steel 400,000 tons less. Exports at 3,289,600 tons show the inclusion in Belgian figures of the Luxemburg foreign sales.

The Output and Exports of the World

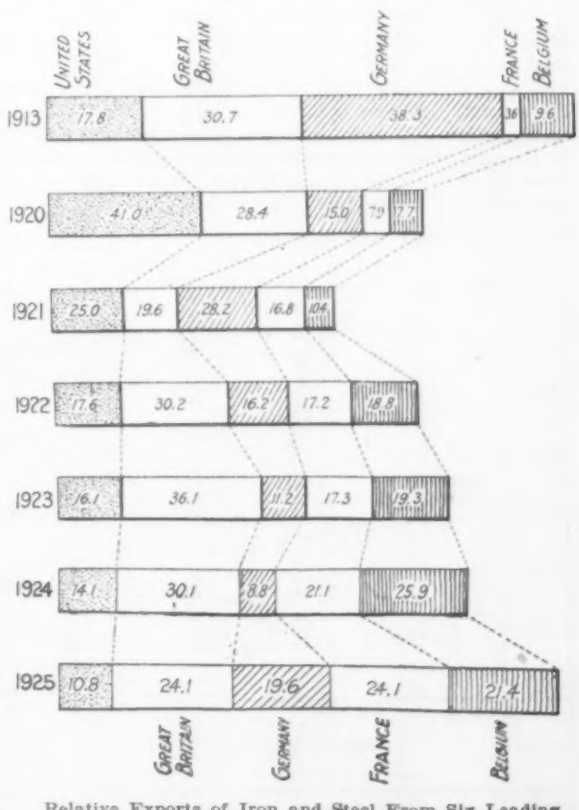
A COMBINATION of the data of the six countries, as given in the large table furnishes a basis for comparisons both as to production and exports. The notable feature is the total steel production of the world, as judged by the six countries—75,284,500 tons, the largest on record. Almost equally important was the expansion in world exports to 15,406,600 tons, the largest since the war.

In steel the world output last year was 11.8 per cent in excess of that of 1924, also larger than the pre-war record, and 16.4 per cent greater than the 1913 volume. In exports the 1925 total of 15,406,600 tons was 95 per cent of the pre-war, or 1913 volume comparing with 81.3 per cent for the 1924 total. Seven years after the war, the world demand for steel is still less than before the war.

In pig iron a new record was made last year. It was, however, still less than that of 1913. At 66,142,900 tons there was a gain of 7,338,700 tons, or nearly 12.5 per cent over 1924.

The American proportion of the world steel output loomed large last year. The 45,250,000 tons was 60 per cent. In 1924 the corresponding figure was 47.4 per cent; in 1913 it was 46.8 per cent. In 1920, 1922 and 1923 the American proportion exceeded last year's. In pig iron the American output last year was 55.5 per cent against 53.4 per cent in 1924 and 45.6 per cent in 1913. In 1923 the ratio was 65 per cent.

In world exports France shared with Great Britain last year the largest proportion, 24.1 per cent each. Belgium was second with 21.4 per cent and Germany third with 19.6 per cent. The United States was last with 10.8 per cent. The diagram shows how these proportions compared with those of other years. The feature has been the expansion of France from 3.6 per cent in 1913 to 21.1 per cent in 1924 and to 24.1 per cent in 1925. The recovery of Germany is also noteworthy—19.6 per cent last year against only 8.8 per cent in 1924. The American position is emphasized when it is stated that, producing 60 per cent of the steel output of the world last year and 55.5 per cent of the pig iron, the United States exported only 10.8 per cent of the total. On the other hand the large consumptive powers of the American nation are revealed.



Relative Exports of Iron and Steel From Six Leading Countries, Luxemburg Being Included in Belgium. The poor showing of the United States and the expansion in German exports are emphasized

Wages Have Not Been Deflated

Large Buying Power for Labor Needed to Sustain Mass Production—Immigration Act Wins Approval—Foreign Competition Not Feared by Industry

BY GILBERT L. LACHER*

LABOR has not been deflated. In the five years following the boom of 1920 various industrial leaders and economists often emphasized the need of a depression of wage levels as the final phase in post-war readjustment. Yet wages have shown great stability in terms of dollars and have actually risen in buying power. Moreover, many who were insistent on wage deflation have now changed their views.

This new attitude seems largely due to a better appreciation of the importance of the domestic market for American products. After the war, industry looked abroad for extraordinary demands from restoration work following four years of destruction. A brief spurt in foreign trade did develop during the post-war boom, but a reaction again centered attention on domestic business.

Mass production on the scale developed in American plants can be kept up only by mass consumption. In other words, the buying power of the American public is the most important factor controlling the volume of business which industry can hope to build up. American industrialists, with few exceptions, have no interest in reducing wages. They realize that cheaper labor is not synonymous with lower production costs, but, on the contrary, may mean higher prices and greater consumer resistance. Their attention is rather focused on cutting the cost of labor per unit of product. If that is accomplished and wages remain unchanged, or actually advance, the purchasing power of labor is that much expanded and the market for the products of industry is widened in like degree.

With the new viewpoint on wages has come a different attitude toward immigration. Many industrial leaders who actively opposed restricting immigration are now convinced that it is for the best interests of the country. Others, not yet entirely satisfied with the immigration act, now limit their demands for revision to the admission of larger numbers of skilled workmen. There is more disposition to regard the exclusion of the unskilled as desirable. Cheap foreign labor always meant a lower standard of living and lower consuming power.

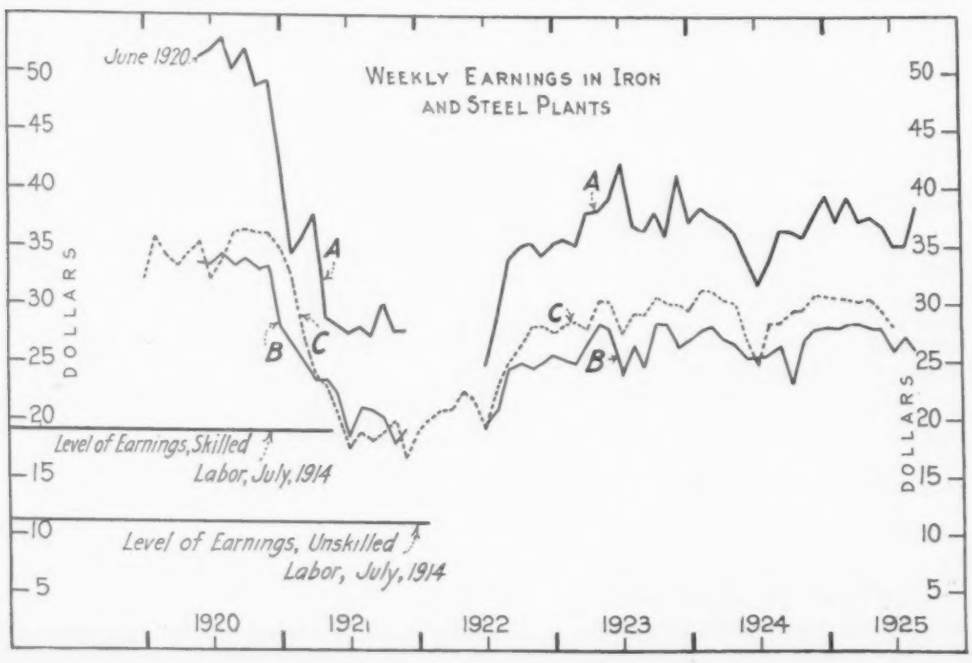
Social conditions have been improved by limiting immigration. Furthermore, regulation of the human inflow has protected American industry from the emotional and psychological distress of Europe. There has been a marked decline in the influence of radical movements with which the foreign worker is too often associated, and the general intelligence of labor has been raised. Output per man has been increased. Also the attitude of labor in all ranks toward efficiency in production has changed.

In the words of a keen student of the problem, industry is beginning to appreciate the value of an intelligent working force that has thoroughly absorbed American ideas. What he had in mind by "American" was a conception of the common interest of labor and management, as against the view that their relations are normally and necessarily in conflict.

Efforts of employers to get their men to see the mutual import of manufacturing policies have had increasing success. In fact, the viewpoint of organized labor itself has changed. Before the war American trade unionism was strongly influenced by the European attitude, which has always been unsympathetic and has vitiated much of the possible gain from machinery by restricting output. Today we find the American Federation of Labor abandoning the cost of living as a basis for wage demands and adopting the principle that wages should be increased with the expanding productivity of industry. In other words, it has recognized the benefits of scientific management, realizing that opposition to methods of increasing output per unit of work has only delayed improvement in the status of labor.

It will be interesting to see how the acceptance of the partnership of workers and management will affect the labor union movement. In the past organized labor has thrived on conflict, and it remains to be seen whether the interest of the union member will lag if the rallying cry of the strike is abandoned. Moreover,

* Associate Editor THE IRON AGE



Line A Shows The Average Weekly Earnings by Months of Skilled Workers in Iron and Steel Plants and Line B the Average Weekly Earnings of Unskilled Labor. Both curves are based on statistics compiled by the National Industrial Conference Board, New York. The levels of earnings, as of July, 1914, for both classes of labor are indicated by the horizontal lines. Line C shows weekly earnings for all employees in iron and steel plants which report to the Bureau of Labor Statistics, Washington

Cheaper labor is not synonymous with lower production costs.

Attention is focused on cutting the cost of labor per unit of product.

Greater buying power for labor means a better domestic market for American products.

The immigration act is now more generally regarded as beneficial. Cheap foreign labor meant a lower standard of living and lower consuming power.

Labor, including trade unionism, now recognizes it is a partner with management in promoting productivity.

Limited immigration has stimulated the use of labor-saving equipment. Labor has also become more receptive to instruction in improved methods.

Agriculture is an uncertain factor affecting the wage structure. The buying power of the farmer—fully as important as that of the factory worker—is subject to the fortunes of weather and a fluctuating world demand.

concentration on productivity and on waste elimination is apt to foster loyalty to one's plant rather than to a national labor organization. To encourage such a viewpoint many large companies have developed works councils or similar means of getting in closer touch with their employees. They have had good success in convincing the worker that in this way his job will be made more secure and that his wages will be kept as high as sound conduct of the business will permit. They have studied to avoid paternalism and, above all else, to win the confidence of the workers. The works councils, disparagingly referred to by organized labor as "company unions," supply established and effective means of contact with the management.

The growth of works councils has been concurrent with unusual stability in wages. It is an economic axiom that unions thrive in boom times when strikes can be called with reasonable hopes for success. Hav-

Labor Earnings by Months Since 1920

Compiled by National Industrial Conference Board

	Average Hourly Earnings				Average Weekly Earnings				Index Numbers "Real" Earnings	
	Foundries and Machine Shops		Iron and Steel Plants		Foundries and Machine Shops		Iron and Steel Plants		All Wage-Earners 25 Industries	
	Unskilled	Skilled	Unskilled	Skilled	Unskilled	Skilled	Unskilled	Skilled	Hourly	Weekly
July, 1914	$0.214	$0.307	$0.206	$0.321	$10.89	$14.85	$11.20	$19.20	100	100
June, 1920	0.555	0.680	0.576	0.777	28.53	34.10	33.45	51.33	122	118
July	0.553	0.683	0.578	0.755	28.18	34.12	33.41	51.77	120	117
Aug.	0.557	0.688	0.574	0.760	28.61	34.42	34.22	52.82	122	118
Sept.	0.561	0.695	0.579	0.763	28.81	34.36	33.24	50.14	125	120
Oct.	0.552	0.699	0.578	0.788	28.06	34.32	33.81	51.91	126	120
Nov.	0.543	0.694	0.587	0.807	26.56	33.12	32.94	48.79	129	118
Dec.	0.538	0.696	0.578	0.734	28.85	32.81	33.19	49.17	128	117
Jan., 1921	0.520	0.671	0.533	0.725	23.01	29.97	27.89	41.71	130	113
Feb.	0.503	0.665	0.535	0.666	21.39	28.54	26.40	34.21	130	113
March	0.496	0.643	0.475	0.669	20.75	27.04	25.03	36.66	133	117
April	0.488	0.630	0.467	0.672	20.24	25.54	23.26	37.80	132	115
May	0.482	0.626	0.495	0.604	20.05	25.95	23.25	28.68	130	113
June	0.468	0.615	0.476	0.544	19.89	25.29	21.85	28.06	132	114
July	0.450	0.603	0.426	0.468	18.31	24.67	18.28	27.39	127	111
Aug.	0.439	0.591	0.416	0.487	18.63	24.89	20.91	27.92	127	112
Sept.	0.431	0.572	0.412	0.484	18.86	24.16	20.67	27.14	123	109
Oct.	0.418	0.562	0.386	0.464	19.30	24.83	20.19	29.99	122	112
Nov.	0.418	0.558	0.373	0.453	19.41	24.72	17.77	27.50	121	111
Dec.	0.422	0.556	0.377	0.449	19.76	25.47	18.92	27.67	120	112
	First half of 1922 not covered by survey									
July, 1922	0.410	0.543	0.369	0.458	$20.27	$25.93	$19.57	$24.68	125	116
Aug.	0.410	0.549	0.361	0.489	20.36	26.73	21.28	28.73	127	120
Sept.	0.423	0.560	0.408	0.559	21.08	27.27	24.23	33.78	129	122
Oct.	0.429	0.570	0.433	0.590	22.04	28.37	24.68	34.84	129	125
Nov.	0.432	0.573	0.428	0.583	22.06	28.36	24.27	35.38	129	126
Dec.	0.437	0.577	0.444	0.576	22.54	29.02	24.79	34.19	129	126
Jan., 1923	0.430	0.579	0.444	0.555	22.11	28.83	25.65	35.13	129	127
Feb.	0.436	0.586	0.444	0.577	22.09	29.20	25.14	35.50	131	128
March	0.441	0.596	0.438	0.564	22.47	29.85	24.87	34.90	131	128
April	0.466	0.613	0.469	0.615	23.69	31.01	26.63	37.89	136	133
May	0.480	0.625	0.490	0.625	24.35	31.83	28.27	38.09	139	135
June	0.477	0.641	0.491	0.643	24.37	31.73	27.60	38.93	140	135
July	0.480	0.636	0.470	0.626	24.23	31.43	23.58	41.98	138	133
Aug.	0.481	0.640	0.507	0.622	24.33	31.69	26.41	36.67	139	132
Sept.	0.486	0.645	0.497	0.693	24.69	31.09	24.52	36.20	140	131
Oct.	0.482	0.653	0.524	0.711	24.34	32.06	28.22	37.70	140	132
Nov.	0.477	0.648	0.521	0.731	23.78	31.85	28.14	35.94	138	130
Dec.	0.482	0.651	0.506	0.697	23.53	31.42	26.13	41.04	138	130
Jan., 1924	0.482	0.639	0.527	0.698	24.00	31.13	26.91	37.22	139	131
Feb.	0.483	0.640	0.515	0.719	24.25	31.24	27.58	38.43	140	132
March	0.487	0.640	0.510	0.703	24.35	31.16	27.93	37.56	141	131
April	0.493	0.637	0.521	0.710	24.39	31.25	26.80	37.01	142	131
May	0.494	0.639	0.523	0.693	23.70	30.57	26.50	36.26	141	128
June	0.490	0.640	0.507	0.677	23.08	30.44	25.35	33.99	141	125
July	0.486	0.641	0.513	0.683	22.58	29.71	25.42	31.63	142	124
Aug.	0.484	0.641	0.510	0.695	22.68	29.06	25.60	33.73	139	123
Sept.	0.496	0.641	0.500	0.732	23.44	29.73	26.50	36.36	141	126
Oct.	0.492	0.646	0.509	0.693	23.36	30.47	22.93	36.32	139	128
Nov.	0.501	0.651	0.509	0.694	23.54	30.37	26.72	35.86	139	128
Dec.	0.488	0.653	0.512	0.713	23.21	31.30	27.70	37.56	138	129
Jan., 1925	0.505	0.639	0.524	0.691	25.35	30.71	27.91	39.10	136	129
Feb.	0.490	0.643	0.513	0.685	24.26	31.23	27.77	37.12	138	131
March	0.494	0.645	0.510	0.681	24.55	31.38	28.31	39.22	139	131
April	0.488	0.639	0.514	0.692	24.16	31.15	28.23	37.20	139	130
May	0.482	0.642	0.510	0.704	23.79	31.37	27.85	37.50	139	130
June	0.481	0.638	0.513	0.690	23.65	30.73	27.85	36.95	137	126
July	0.483	0.636	0.493	0.682	23.50	30.43	25.75	35.05	135	124
Aug.	0.488	0.639	0.491	0.696	23.85	30.17	27.28	35.01	135	124
Sept.	0.489	0.642	0.478	0.690	24.44	30.79	25.83	38.36	135	128

Weekly Earnings of Labor by Months Since 1920

From Reports of Bureau of Labor Statistics

	Iron and Steel Plants	Foundries and Machine Shops
Jan., 1920	$32.12	....
Feb.	35.61	....
March	35.04	....
April	33.25	....
May	34.42	....
June	35.82	....
July	32.00	....
Aug.	33.85	....
Sept.	36.20	....
Oct.	36.40	....
Nov.	36.17	....
Dec.	36.01	....
Jan., 1921	34.82	....
Feb.	32.47	....
March	27.43	....
April	23.79	....
May	22.65	....
June	20.59	....
July	17.41	....
Aug.	18.96	....
Sept.	18.01	....
Oct.	18.91	....
Nov.	$19.83	....
Dec.	16.54	....
Jan., 1922	18.73	....
Feb.	19.79	....
March	20.59	....
April	20.64	....
May	22.08	....
June	21.56	....
July	19.49	....
Aug.	22.87	....
Sept.	24.93	....
Oct.	26.25	....
Nov.	27.89	....
Dec.	27.98	....
Jan., 1923	27.47	$27.09
Feb.	28.25	27.57
March	28.39	28.33
April	27.75	29.02
May	30.29	29.67
June	30.07	29.91
July	27.42	29.22
Aug.	29.19	28.74
Sept.	29.00	29.62
Oct.	$30.53	$30.10
Nov.	30.03	29.87
Dec.	29.90	30.58
Jan., 1924	29.51	27.83
Feb.	31.19	28.89
March	31.06	29.18
April	30.35	29.18
May	30.03	28.85
June	26.82	28.16
July	24.92	26.44
Aug.	28.22	26.86
Sept.	28.25	26.88
Oct.	29.28	27.87
Nov.	29.49	28.04
Dec.	30.74	29.11
Jan., 1925	30.66	28.54
Feb.	30.52	29.38
March	30.48	29.59
April	30.28	28.87
May	30.43	29.32
June	29.41	28.93
July	27.90	28.34

ing this in mind, it is possible that leaders of American industry may find a way to avoid industrial disturbances, in large measure, by refusing to participate in stampedes for labor in times of scarcity. This does not mean a concerted movement to hold wages down, but rather an effort to prevent them from soaring higher than economic conditions warrant.

At this point the question arises whether the next adjustment in wages may not be downward rather than upward. With a tariff on labor, in the form of the immigration act, how will American industry meet European competition? Imports will increase with the payment of foreign debts and the exportation of American capital. Will this competition force domestic industry to reduce wages? The best answer obtainable from industrial leaders is that they are confident they can meet European competition in the open field because of American superiority in mass production and abundant natural resources in raw materials and in power. It is thought rather that imports will be heaviest in foodstuffs and raw materials which are not produced here, and in specialties, luxury goods and manufactures of high value requiring a great amount of labor. Europe, it is believed, will be forced to drive its industry into channels not dependent primarily on cheap raw materials, where its most abundant resource, cheap labor, can be used to best advantage. To cite one example of the tendency to specialize, English textile makers are concentrating on the manufacture of finer grades rather than on mass output of cheaper textiles.

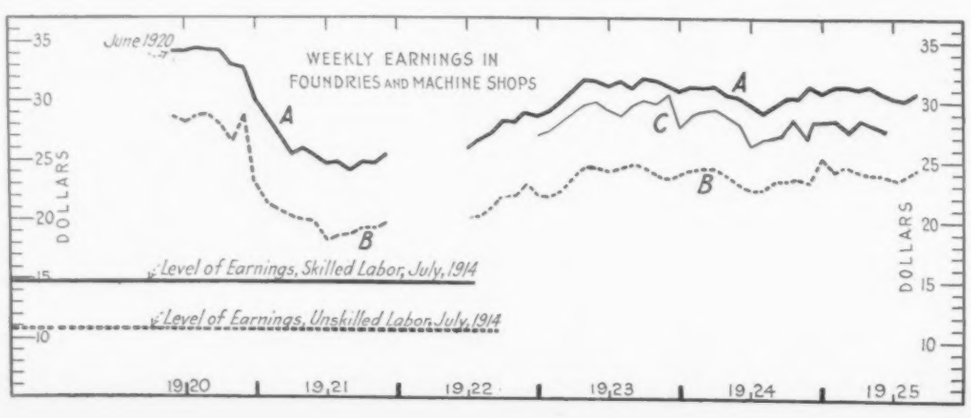
By keeping wages up in this country the restriction of immigration has stimulated the use of labor-saving equipment, particularly for unskilled work. When common labor is plentiful and cheap there is no pressing need to replace men with mechanical devices. With labor dear, the savings to be had by substituting machines for hands cannot be ignored. In turn, the further mechanizing of tasks has increased industrial activity, keeping much plant capacity busy in producing equipment.

The reduced supply of labor has its advantages even if it be assumed that the substitution of machines for hands, in certain cases, brings little reduction in cost. With more machines comes less dependence on labor and greater freedom from its dictates. Equipment is not temperamental—it is not subject to whims and does not cultivate grievances.

Incidentally labor has improved greatly in temper in recent years. It is more receptive to efforts to train men for their tasks. In fact, the rise in efficiency due to teaching employees how best to do their work may have had as much influence on production as the introduction of labor-saving machines.

Although foreign competition and restricted immigration do not appear to threaten the present wage structure, a factor of uncertainty lies in agriculture. Labor and capital profit alike from tariff protection and the advance in productive efficiency. Our farmers, however, must sell their surplus abroad and therefore cannot hope for protective duties in competing with cheaper labor in foreign countries. Furthermore, they have been deprived of cheap immigrant help. The collapse of the grain market after the boom of 1920 brought the insistent complaint from agriculture that prices of farm products were too low in comparison with those of manufactures. Happily, farm products have risen in the world markets and the maladjustment of farm and factory products has largely disappeared. However, the farmer's buying power must still be looked to as having as much influence on prosperity as that of the factory worker.

The hope of agriculture, even more than that of industry, lies in better methods of production. Only by increasing output per man can the American farmer hope to maintain his standard of living in competition with the peasant abroad. Eventually the United States

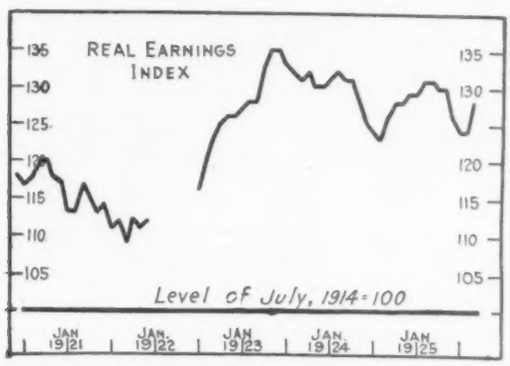


Line A Shows the Average Weekly Earnings by Months of Skilled Workers in Foundries and Machine Shops and Line B the Average Weekly Earnings of Unskilled Labor. Both curves are based on data supplied by the National Industrial Conference Board, New York. The horizontal lines show the earnings levels of the two classes of labor, as of July, 1914. Line C shows average earnings for all employees in shops reporting to the Bureau of Labor Statistics, Washington

will probably consume more food than it produces, but meanwhile our agriculture will be subject to the fortunes of weather and a fluctuating world demand.

What Statistics of Earnings Show

Actual earnings are a better index of the position of labor than wage rates. Moreover, weekly earnings better reflect the income of the workman than hourly earnings, because in the former are taken into account time lost for sickness, lay-offs and holidays. In an



The Real Earnings of All Wage Earners in 25 Industries, as Compiled by the National Industrial Conference Board. The earnings of labor translated into purchasing power indicate a much more favorable position in the past three years than during the boom year, 1920, or the years of recovery, 1921 and 1922. The earnings level of July, 1914, is used as a base for the index numbers.

accompanying table are shown both the average hourly and average weekly earnings for unskilled and skilled labor in iron and steel plants and foundries and machine shops. The averages are given by months from June, 1920, to September, 1925, except for the first half of 1922. The averages for July, 1914, are also shown. The actual amount in the pay envelope is not an accurate measure of the purchasing power of labor. The wages must be related to the prices of commodities consumed to develop the "real" earnings of labor. A fair index of real earnings can be obtained only by comparing the income of labor in a wide group of industries with the prices of a representative range of commodities. In the table are shown the real earnings of all wage earners in 25 industries. The index numbers and the average earnings of workers in iron and steel plants and foundries and machine shops were prepared by the National Industrial Conference Board, New York, from the payrolls of several thousand American plants.

In another table are shown weekly earnings in iron and steel plants and foundries and machine shops, as computed from statistics compiled by the Bureau of Labor Statistics, Washington. These data, for 1920 and 1921, show the entire payroll, the number on the payroll and the number of plants reporting by half-months. Since that time the figures have been given for a single week in each month. While the number of plants reporting has varied somewhat, it is assumed that this has not materially affected the comparative value of the average earnings per employee, as computed. These averages are for all employees on the payroll, as distinguished from those prepared by the National Industrial Conference Board which separate the earnings of the skilled and unskilled. Accompanying graphs indicate a marked correlation between the three averages.

It will be noted from the graphs that earnings reached their highest in 1920 and their lowest in 1921 and 1922. Since that time they have shown little material variation. At no time in the six-year period have they dipped to the levels of 1914.

Whereas actual earnings were highest in 1920, real earnings were relatively low in that period—considerably lower than in the years 1923 to date. The highest point reached by real earnings, as shown by another graph, was in the first half of 1923. Throughout the entire period covered by the graph real earnings are considerably higher than they were in July, 1914, which is used as a base for the index.

Labor's New Wage Declaration

Real Wages Should Be Increased in Proportion to Gain in Industrial Productivity if Consumption Is to Be Maintained

BY JOHN P. FREY*

THE American Federation of Labor recently adopted a new wage policy which has aroused much public discussion. This departure from the traditional position of organized labor may have far-reaching effects in the business world. The accompanying exposition of the new policy, prepared by the author of the original resolution in the Atlantic City convention of the American Federation of Labor, will be of more than passing interest to those who bear the responsibility for payrolls and profits.

IS there a sound economic principle for the determination of wages?

Believing that this important question could be answered in the affirmative, the convention of the American Federation of Labor, held in Atlantic City during October, 1925, adopted a wage principle, the substance of which was that the workers' real wage, the purchasing power of their wages, must increase in proportion to man's increasing powers of production.

The subject was introduced into the convention as an addition to the report which one of the committees was submitting upon the question of wages. The new principle, as presented by one of the delegates from the floor, read:

"Social inequality, industrial instability and injustice must increase, unless the workers' real wage, the purchasing power of their wages, is increased in proportion to man's increasing powers of production."

The discussion which followed, and in which a number of delegates participated, indicated that the principle of economics involved was quite thoroughly understood.

When the subject came before the convention for final action, the element of hours of labor was included. This was unnecessary, and, perhaps unfortunate, for the question of a sound principle for wages must stand or fall upon its merits.

After the adoption of the new wage principle, President William Green gave it his hearty approval, both on the convention floor and during interviews with newspaper representatives. Since then the con-

*Editor, *International Molders' Journal* and member executive committee of the American Federation of Labor.

vention's action has been a subject of active discussion, editorially and otherwise, in a number of the country's leading newspapers, magazines, trade publications, and journals of economics.

Why has the American trade union movement adopted a new statement of the wage principle? Is it an admission that its previous wage policies and principles are now believed to have been unsound? Is the trade union movement moving away from the general principles which have governed its policies in the past? Is theory taking the place of practical considerations? Is American labor being influenced by European theories? These are some of the many questions which have been asked.

Increased Productivity

ANSWERS to these questions will be found in those startling developments in industry within recent years, which have so tremendously increased man's power to produce. Modern methods of production have created changes as great as the difference between the hand-paddled dugout and the transatlantic liner.

A century ago the shoe maker looked upon the finished product of his skill and labor with the knowledge that, as a result of his individual skill and effort, raw material had been transformed into a finished product. Today power-driven machinery has so tremendously increased the shoe maker's capacity for production that our shoe industry finds it increasingly more difficult to secure a market which will absorb the industry's capacity to produce.

We are informed by the representatives of this industry that, if their plants were operated full time for 60 per cent of the working days, they would be able to more than supply the nation's requirements. Yet this industry, like many others, is at the beginning, rather than the end, of its capacity to increase production through improvements in machinery and in shop management.

What is true of the shoe industry is largely true of all others; in some of them the capacity to produce being little short of the fabulous.

Another great factor increasing production is the continually growing use of giant power. The water from a thousand streams flows through turbines, the electricity generated in turn operating the huge machinery of modern industrial establishments. Yet we are just beginning the use of hydroelectric power.

Production is also being increased greatly by modern methods of shop practice and management, which eliminate waste and unnecessary labor. Engineering skill applied to methods of production, the use of electric power, of themselves, have tremendously increased man's power to produce.

The great changes which have taken place within the last quarter of a century cannot be fully stated because the data are insufficient.

Increase in Per Capita Output

THE economists who have studied such reliable statistics as are available inform us that during the past 25 years the increase in production per capita in American industry has been approximately 40 per cent. The Department of Commerce informs us that during the period 1919-'23 our industries increased their volume of production 9 per cent. The Federal census reports that during the same period 3 per cent fewer employees were engaged in these industries.

While dollar and cent wages have shown a marked increase during this period, the real wage, the purchasing power of the dollar, has increased but little, approximately 4 per cent being the amount given to us by the leading economists. If these figures are approximately accurate, it follows that the mass of the people are less able to purchase what industry produces than they were a quarter of a century ago.

Wages have been considered from various points of view. Some have looked upon wages in the same manner as upon any commodity or article of commerce. Others have believed that some other principle should be the most active, for the workman is a human being, an important part in determining the standard of living in the community where he resides. The question of wages has been approached from practically every angle, except the one so clearly announced by the recent convention of the American Federation of Labor.

The present wage policy is based upon nothing more nor less than sound economic grounds.

Man's power to produce must not be curtailed. Industry to be successful must have a market for its products. It is, therefore, necessary that man's power to consume should be increased.

Man's increasing powers to produce cannot be absorbed by the more backward countries as in the past, for modern industrial methods are finding their way into the four corners of the world. The whir of the loom and the roar of the forge are now heard in countries which, but a few years ago, depended wholly upon Western Europe and America for the bulk of their manufactured goods.

There is a type of producer still found in several great countries who serves as a practical comparison. He is the unskilled coolie, and his number is millions. As a producer his brains are of little value, a strong back being the greatest essential. The sum total of his product is so small that much higher wages would be impossible.

Coolie Standards of Living

THE coolie wears cotton trousers and a cotton shirt. Straw covers his head and supplies sandals for his feet. A rough shawl or padded blanket over his shoulders keeps out the cold. The coolie countries, for this reason, are unable to maintain large shoe, garment, hat making industries. The coolie's hut is such that no large building trades can exist. The simple furnishing and conveniences of his hovel can maintain no furniture, piano, phonograph, radio, printing or others of those industries which flourish in the countries where, because man's power to produce has been greatly increased, the consuming power of the people has also advanced.

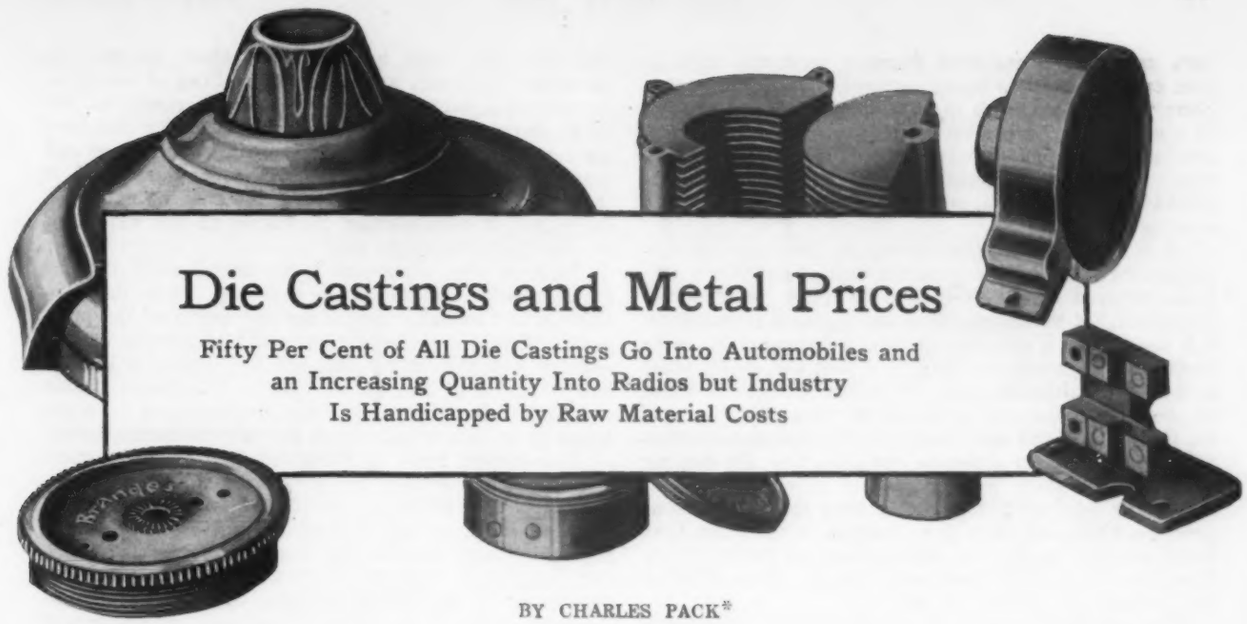
If American labor, and American labor standards, were to be replaced by coolie labor and coolie standards, American industries would cease to carry on, except as they found a foreign market. The great bulk of our industries whose production is now consumed within the nation's borders would close their doors, because they would have no market.

There are two general conclusions which seem to be justified: We are at the beginning, rather than the end, of industry's power to produce. The inventor's and the engineer's skill and the harnessing of nature's power to machinery will, and for the welfare of civilization they should, continue to increase greatly man's powers to produce.

The spread of modern industrial methods in the more backward countries will compel the greater civilized nations to depend more and more upon the ability of their citizens to consume the products of their own industries.

One of the most understanding comments upon the American Federation of Labor's wage principle was expressed in the November Monthly Letter of the National City Bank of New York. From this the following excerpts are reproduced:

> There can be no controversy over the proposition that "real wages"—"the purchasing power of wages"—must increase in proportion to man's increasing power of production. * * *
>
> It is not only true that his real gains must come through industrial progress, but that industrial progress will utterly fail of results, and actually choke down for want of an expanding market, unless there is the widest possible distribution of benefits.
>
> All plans for increasing production necessarily contemplate a corresponding increase of consumption, and the only way that consumption can be obtained is through a constant increase in the buying power of the masses. Broadly speaking, everything produced in all the industries must be sold back to the people engaged in the industries, for there is no other way of disposing of the output.



Die Castings and Metal Prices

Fifty Per Cent of All Die Castings Go Into Automobiles and an Increasing Quantity Into Radios but Industry Is Handicapped by Raw Material Costs

BY CHARLES PACK*

THE die casting process is becoming universally recognized as one of the important methods available for the manufacture of metal parts. Although this process was highly experimental 15 years ago, today every mechanical and electrical engineer gives careful consideration to the use of die castings in the design of mechanical and electrical apparatus. It is evident, therefore, that recent and future progress in the die casting art is dependent largely upon the progress made in the various arts of manufacture using metal parts in large quantities.

The die casting industry of today owes its success mainly to the development of the automotive industry, where quantity production of metal parts is an essential factor. It is safe to say that at least 50 per cent of all die castings manufactured are used in automotive equipment.

Ten years ago the phonograph ranked next to the automobile in the volume of die castings used. During the last two years the constant development of the radio industry has placed the radio receiving set next to the automobile in its relative importance as a user of die-cast parts. The outstanding feature of the past year in the die casting industry has been the extensive application of die castings to radio manufacture.

One part, common to all radio receiving sets and known to most laymen, is the so-called variable condenser. Each condenser consists of two major parts, known as the rotor and the stator. Before the adoption of the die-cast condenser, these parts were assembled with the use of a large number of sheet metal blades and accurately machined spacers. A 40-blade condenser would, of necessity, be composed of 40 sheet metal blades and 40 accurately machined spacers, besides a number of screws, shafts, etc. The possible variation, due to the inaccuracies of machining and assembly, is readily apparent. By the die casting process a rotor or a stator is produced integrally in one casting with a high degree of accuracy. Many radio engineers also contend that a die-cast condenser is far superior to an assembled condenser from an electrical efficiency standpoint.

A large number of condensers are also made with the blades stamped from sheet metal, inserted in the die casting die, and cast together by the die casting process. The all die-cast condenser and the sheet metal blade die-cast condenser are rapidly replacing the assembled condenser, and it is probable that the latter type of condenser will soon disappear from the market.

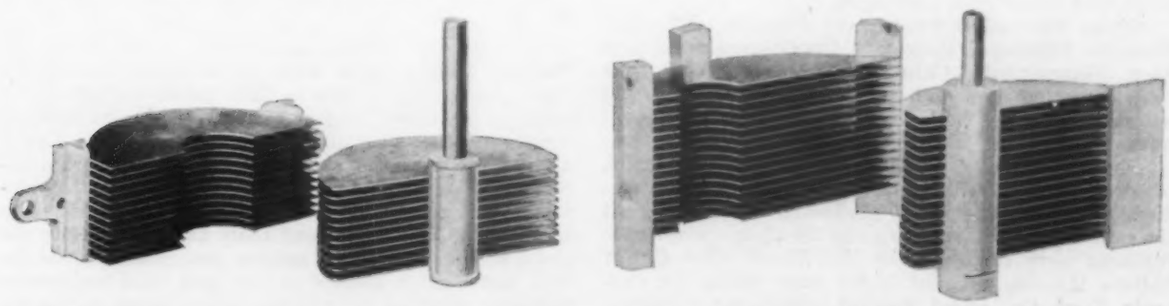
Die castings are finding hundreds of other uses in radio construction. Die-cast housings are being used for radio sets in preference to wood and hard rubber substitutes. Most metal parts on loud speaker units are now die-cast. The coming year will witness the introduction on a large scale of the combination phonograph and radio. Die castings are used largely in the coordination of these two useful instruments in one unit.

Commercially the die casting industry at this time is confronted with serious difficulties in the form of high zinc and aluminum prices. In order to appreciate this phase of the industry, a brief outline of the competitive status of die castings is essential.

Die castings are metal castings made by forcing molten metal, under pressure, into metallic molds or dies. Of necessity, about 90 per cent of all die castings are produced from zinc or aluminum base alloys in which the zinc or aluminum is over 90 per cent of the metal. From this, it follows that the cost of zinc and aluminum ingots is a highly important factor in the die casting industry.

In the adoption of a method for the production of metal parts, the modern engineer must carefully consider manufacturing costs. On a pound basis, die cast-

*Vice-President Doehler Die-Casting Co., Brooklyn.



By the Die Casting Process a Radio Condenser Rotor or Stator May Be Produced in One Casting With a High Degree of Accuracy. Many condensers are made also with the blades stamped from sheet metal, inserted in the die casting die, and cast together by the die casting process

ings cannot compete with foundry products, such as iron castings or even brass castings. Die castings are, however, more accurate than sand castings and the use of a die casting in preference to a sand casting invariably depends upon the answer to the following problem: Will the die casting save sufficient machine operations to pay for its additional cost over a sand casting?

It is evident that the answer to this question depends to a large extent upon the cost of the raw materials involved in the processes. Further to illustrate this point, let us assume that an engineer is considering the use of a zinc die casting weighing 3 lb., with the option of using cast iron, and that the choice must be based on ultimate cost. With zinc at 6c. the value of the zinc in the casting would be 18c. With zinc at 9c. the value of the zinc would be 27c. In simple terms this means that in order to compete, the die casting process must show 9c. per casting greater saving in machining cost with the higher zinc cost. In actual practice, there are very few castings of that size that would cost 9c. to machine, when produced in quantities. The result in such a case would be the elimination of die casting from consideration.

The hypothetical case cited actually represents the commercial status of the die casting industry today. Whereas zinc could be bought at about 6c. per lb., or lower, two years ago, it is now selling at above 9c. per lb. It is safe to say that as zinc increases 1c. per lb. in cost the possible field of application for zinc base die castings is reduced by 15 per cent. The cost of raw materials in competing processes has not increased in the same proportion. Although the cost of cast iron fluctuates, it very seldom fluctuates to the extent of 1c. per lb., or $20 per ton.

Next to zinc, aluminum is the metal most vital to the success of the die casting industry. Here the situation is just as bad. Before the enactment of the present tariff law ingot aluminum could be bought in this country and abroad for 18c. per lb. Today it is difficult to obtain at 28c. per lb. On an aluminum casting weighing 3 lb., the die casting process must face the handicap of 30c. greater cost for raw materials today.

It is evident from the foregoing that the die casting industry will continue to grow with the other metal industries only if the prices of zinc and aluminum remain constant, or are reduced to previous levels. On the other hand, further increases in the cost of these two important elements will not only prevent the growth of the die casting industry, but may reduce the economic value of the process to a point where it will cease to be a factor in the metal industry.

The Aftermath of Pittsburgh Plus

Plural Basings Cause No Marked Redistribution of Business Between Producing Centers—Water Hauls Break Down Rail Rate Barriers —Chicago's Exclusion from Pacific Coast Market

NINETEEN TWENTY-FIVE was the first complete year under the plural basing points which came into being with the general abandonment of Pittsburgh Plus. It is too early to foresee the ultimate effect of this marked change in sales practice, but so far the relative positions of the different producing centers have not been materially altered. It is evident that a line separating the country into two sections, one in which railroad freight rates are favorable to Chicago and another tributary freightwise to Pittsburgh, does not truly reflect the division of steel business between producing districts. In the first place, there are other basing points besides Chicago and Pittsburgh, namely Birmingham on plates, shapes and bars, Lorain, Ohio, on pipe, and Birmingham, Cleveland, Worcester, Duluth, and Anderson, Ind., on wire products. Moreover, the use of river barge and ocean vessel is enabling mills to overcome rail freight disadvantage in important markets. Finally, transportation costs are not the one determining factor in defining market areas. In many instances, mills have found that the building up of new trade would be more costly than the absorption of freight on business from long established customers.

Those who looked for a heavy diversion of tonnage from the Pittsburgh district to the Chicago mills have been disappointed. Chicago district producers have been operating at a high rate for several months, but so also have the mills east of the line of freight advantage.

There is also no conclusive indication that expansion of steel capacity will be concentrated in the Chicago district at the expense of producing centers east of the railroad freight boundary. In 1924 four open-hearth furnaces were completed by the Inland Steel Co. at Indiana Harbor, Ind., but in the same period the Carnegie Steel Co. added two at its Edgar Thomson works, Pittsburgh, and the Republic Iron & Steel Co. one at Youngstown. In 1925 one Trumbull Steel Co. open-hearth furnace was completed on the Pittsburgh side of the line, while the Ford Motor Co., Detroit, which is practically equi-distant freightwise from Chicago and Pittsburgh, completed four. On the other hand, in the Birmingham district four new open-hearth furnaces have been put into operation by the Tennessee Coal, Iron & Railroad Co. In 1923, before the complete abandonment of Pittsburgh Plus, five open-hearth furnaces were completed by the Wisconsin Steel Works, Chicago, whereas east of the freight rate line, four were added by the Otis Steel Co. at Cleveland and five by the Bethlehem Steel Co., at Sparrows Point, Md.

New finishing equipment is being built in the Chicago district, but the Pittsburgh area is also making improvements which will expand its mill output. The Jones & Laughlin Steel Corporation, the Pittsburgh Steel Co. and the Youngstown Sheet & Tube Co. are spending large sums. Although much of the expenditure is to introduce economies rather than to add new facilities, the effect of efficient equipment, like the adding of capacity, is to increase production. The Weirton Steel Co., only 40 miles from Pittsburgh, is about to make plant extensions to cost $10,000,000 to $15,000,000.

So much attention has been given to the handicaps imposed on the Pittsburgh area by the abolition of Pittsburgh Plus, that Chicago's loss of the Pacific Coast market has been largely overlooked. Until 1918 lower railroad freight rates were permitted to the Pacific Coast ports than to intermediate points so that transcontinental roads might compete with intercoastal steamship lines operating through the Panama Canal. During the war the ships were withdrawn from intercoastal service and the Interstate Commerce Commission authorized the re-establishment of rail rates without relief from the long and short haul rule. After the close of the war ocean service was resumed and by 1921 water rates became so low that steel which was formerly supplied by Chicago mills began to be diverted to mills closer to seaboard. Today the Chicago producers are no longer factors in the Pacific Coast business. It is an interesting coincidence that in 1921, when water competition was first severely felt, Chicago

Freight Rates from Pittsburgh on Finished Steel

(Per 100 Lb.)

Pittsburgh to	Nails and Wire	Plates Shapes Bars	Sheets	Tin Plates
Alabama—				
Birmingham	$0.58	$0.58	$0.58	$0.58
Mobile	0.67	0.67	0.67	0.67
Arizona—				
Phoenix	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Arkansas—				
Fort Smith	0.76	0.79	0.735	0.76
Little Rock	0.725	0.75	0.70	0.76
Smackover	0.795	0.82	0.77	0.76
California—				
Los Angeles, all rail	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Los Angeles, rail and water	0.71 to 0.7275	0.71 to 0.72	0.70 to 0.7275	0.70 to 0.7275
San Francisco, all rail	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
San Francisco, rail and water	0.665 to 0.66	0.6475 to 0.66	0.665 to 0.66	0.665 to 0.66
Colorado—				
Denver	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Pueblo	1.15‡ / 1.45**	1.15 / 1.40‡‡	1.15 / ‡	0.90 / 1.65‡‡
Florida—				
Jacksonville, all rail	0.70	0.70	0.70	0.70
Jacksonville, rail and water	0.415	0.415	0.415	0.415
Tampa, all rail	0.955	0.955	0.955	1.085
Tampa, rail and water	0.61	0.61	0.61	0.61
Georgia—				
Atlanta	0.58	0.58	0.58	0.58
Savannah, all rail	0.66	0.66	0.66	0.66
Savannah, rail and water	0.415	0.415	0.415	0.415
Idaho—				
Common Points	1.15‡ / 1.40**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Illinois—				
Chicago	0.34	0.34	0.34	0.34
Peoria	0.385	0.385	0.385	0.385
Moline	0.43	0.43	0.43	0.43
Springfield	0.41	0.41	0.41	0.41
Indiana—				
Anderson	0.305	0.305	0.305	0.305
Evansville	0.36	0.36	0.36	0.36
Indianapolis	0.31	0.31	0.31	0.31
Hammond	0.34	0.34	0.34	0.34
Muncie	0.30	0.30	0.30	0.30
Terre Haute	0.34	0.34	0.34	0.34
Fort Wayne	0.29	0.29	0.29	0.29
South Bend	0.32	0.32	0.32	0.32
Iowa—				
Davenport	0.43	0.43	0.43	0.43
Des Moines	0.60	0.60	0.60	0.60
Sioux City	0.735	0.735	0.735	0.735
Waterloo	0.54	0.54	0.54	0.54
Kansas—				
Hutchinson	0.975	1.02	1.02	0.90
Leavenworth	0.735	0.735	0.735	0.735
Topeka	0.85	0.85	0.85	0.85
Wichita	0.975	1.02	1.02	0.90
Kentucky—				
Louisville	0.33	0.33	0.33	0.33
Paducah	0.44	0.44	0.44	0.44
Ashland	0.28	0.28	0.28	0.28
Newport	0.29	0.29	0.29	0.29
Louisiana—				
New Orleans	0.67	0.67	0.67	0.67
Shreveport	0.82	0.79	0.79	0.76
Maryland—				
Baltimore	0.31	0.31	0.31	0.31
Cumberland	0.155	0.155	0.155	0.155
Michigan—				
Detroit	0.29	0.29	0.29	0.29
Flint	0.31	0.31	0.31	0.31
Grand Rapids	0.33	0.33	0.33	0.33
Jackson	0.29	0.29	0.29	0.29
Kalamazoo	0.31	0.31	0.31	0.31
Minnesota—				
Duluth	0.60	0.60	0.60	0.60
St. Paul	0.60	0.60	0.60	0.60
Minneapolis	0.60	0.60	0.60	0.60
Mississippi—				
Gulfport	0.67	0.67	0.67	0.67
Jackson	0.64	0.64	0.64	0.64
Meridian	0.62	0.62	0.62	0.62
Vicksburg	0.64	0.64	0.64	0.64
Missouri—				
Independence	0.735	0.735	0.735	0.735
Kansas City	0.735	0.735	0.735	0.735
St. Louis, all rail	0.43	0.43	0.43	0.43
St. Louis, rail and river via Louisville	0.35	0.35	0.35	no rate
Montana—				
Common Points	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Nebraska—				
Omaha	0.735	0.735	0.735	0.735
Lincoln	0.78	0.78	0.78	0.78
Grand Island	0.96	0.96	0.96	0.90‡ / 0.96††
Hastings	0.96	0.96	0.96	0.90‡ / 0.96††
Nevada—				
Common Points	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
New England—				
*Common Points	0.365	0.365	0.365	0.365
New York—				
New York	0.34	0.34	0.34	0.34
Buffalo	0.265	0.265	0.265	0.265
Syracuse	0.285	0.285	0.285	0.285

Pittsburgh to	Nails and Wire	Plates Shapes Bars	Sheets	Tin Plate
New Jersey—				
Camden	0.32	0.32	0.32	0.32
Newark	0.34	0.34	0.34	0.34
New Mexico—				
Albuquerque	1.15‡ / 1.45**	1.15† / 1.16††	1.15 / 1.16††	0.90‡ / 1.59††
Santa Fe	1.15 / 1.45**	1.15† / 1.40‡‡	1.15 / ‡	0.90‡ / 1.65‡‡
North Carolina—				
Raleigh	0.48	0.48	0.48	0.48
Asheville	0.57	0.57	0.57	0.57
Charlotte	0.51	0.51	0.51	0.51
North Dakota—				
Bismarck	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Fargo	0.91	0.91	0.91	0.90‡ / 0.96‡‡
Ohio—				
Akron	0.19	0.19	0.19	0.19
Canton	0.175	0.175	0.175	0.175
Cleveland	0.19	0.19	0.19	0.19
Cincinnati	0.29	0.29	0.29	0.29
Dayton	0.275	0.275	0.275	0.275
Columbus	0.255	0.255	0.255	0.255
Mansfield	0.24	0.24	0.24	0.24
Portsmouth	0.28	0.28	0.28	0.28
Toledo	0.27	0.27	0.27	0.27
Youngstown	0.11	0.11	0.11	0.11
Massillon	0.175	0.175	0.175	0.175
Zanesville	0.23	0.23	0.23	0.23
Oklahoma—				
Enid	0.975	0.975	1.02	0.90‡ / 1.245††
Muskogee	0.87	0.87	0.87	0.90‡ / 1.13††
Oklahoma City	0.975	0.975	1.02	0.90‡ / 1.245††
Tulsa	0.87	0.87	0.87	0.90‡ / 0.92††
Oregon—				
Portland	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Pennsylvania—				
Bethlehem	0.32	0.32	0.32	0.32
Johnstown	0.11	0.11	0.11	0.11
Philadelphia	0.32	0.32	0.32	0.32
Erie	0.22	0.22	0.22	0.22
South Carolina—				
Charleston	0.58	0.58	0.58	0.58
South Dakota—				
Aberdeen	0.85	0.895	0.85	0.895
Sioux Falls	0.755	0.755	0.755	0.755
Yankton	0.825	0.825	0.825	0.825
Tennessee—				
Chattanooga	0.50	0.50	0.50	0.50
Memphis, all rail	0.56	0.56	0.56	0.56
Memphis, rail and river via Louisville	0.407	0.407	0.407	0.407
Texas—				
Austin	0.975	1.02	1.02	0.90‡ / 1.43††
Beaumont	0.84	0.84	0.87	0.88
Dallas	0.975	1.02	1.02	0.90‡ / 1.43††
Fort Worth	0.975	1.02	1.02	0.90‡ / 1.43††
Houston	0.84	0.84	0.87	0.88
Galveston	0.84	0.84	0.87	0.88
Wichita Falls	0.975	1.02	1.02	0.90‡ / 1.43††
Utah—				
Ogden	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Salt Lake City	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Virginia—				
Norfolk	0.38	0.38	0.38	0.38
Newport News	0.38	0.38	0.38	0.38
Richmond	0.38	0.38	0.38	0.38
Washington—				
Seattle, all rail	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Seattle, rail and water	0.70	0.70	0.70	0.70
Spokane	1.15‡ / 1.45**	1.15 / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
West Virginia—				
Charleston	0.285	0.285	0.285	0.285
Morgantown	0.19	0.19	0.19	0.19
Wheeling	0.11	0.11	0.11	0.11
Wisconsin—				
Milwaukee	0.37	0.37	0.37	0.37
Madison	0.455	0.51	0.435	0.435
Green Bay	0.435	0.435	0.435	0.435
Manitowoc	0.405	0.405	0.405	0.405
Wyoming—				
Casper	1.15‡ / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡
Rawlins	1.15 / 1.45**	1.15† / 1.40‡‡	1.15‡ / ‡	0.90‡ / 1.65‡‡

*Embraces Massachusetts, Rhode Island and Connecticut and the southern part of Vermont, New Hampshire and Maine.

‡Minimum carload of 80,000 lb.

‡‡Minimum carload of 40,000 lb.

**Minimum carload of 50,000 lb.

†Minimum carload of 60,000 lb.

‡Minimum carload of 50,000 lb., $1.30 per 100 lb.; minimum carload of 40,000 lb., $1.40 per 100 lb.

††Minimum carload of 36,000 lb.

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	Angles, Bars, Channels, Plates, Rivets and Sheets	Beams, Tees and Zees
Alabama—		
Birmingham	$0.53	$0.53
Mobile		
All rail	0.57	0.57
Rail and river	0.47	0.47
Arkansas—		
Little Rock		
All rail	0.51	0.56
Rail and river	0.44	0.49
Smackover		
All rail	0.58	0.63
Rail and river	0.51	0.56
Arizona—		
Phoenix	1.00	1.00
California—		
Los Angeles		
All rail	1.00	1.00
Rail, river and ocean	0.80	0.80
San Francisco		
All rail	1.00	1.00†
Rail, river and ocean	0.80	0.80
Torrence	1.00	1.00
Colorado—		
Denver	0.83	0.83
Pueblo	0.83	0.83
Georgia—		
Atlanta	0.58	0.58
Idaho—		
Common points	1.00	1.00
Illinois—		
Moline	0.155†	0.175
Peoria	0.13†	0.155
Springfield	0.155†	0.175
Indiana—		
Anderson	0.24	0.24
Evansville	0.235	0.235
Fort Wayne	0.22	0.22*
Hammond	0.025	0.025
Indianapolis	0.155*	0.25
Kokomo	0.215	0.215
Muncie	0.25	0.25
South Bend	0.13	0.13
Terre Haute	0.155*	0.235
Iowa—		
Des Moines	0.295	0.295
Kansas—		
Hutchison	0.805	0.805
Plates and sheets	0.765	
Leavenworth	0.42	0.42
Topeka	0.51	0.51
Wichita	0.805	0.805
Plates and sheets	0.765	
Kentucky—		
Ashland	0.32	0.32
Louisville	0.30	0.30
Louisiana—		
New Orleans		
All rail	0.57	0.57
Rail and river	0.47	0.47
Shreveport		
All rail	0.60	0.66
Rail and river	0.51	0.57
Maryland—		
Baltimore	0.535	0.535
Michigan—		
Detroit	0.275	0.275
Flint	0.285	0.285
Minnesota—		
Duluth	0.305	0.305
Minneapolis	0.275	0.275
St. Paul	0.275	0.275
Mississippi—		
Jackson		
All rail	0.53	0.53
Rail and river	0.50	0.50
Missouri—		
Kansas City	0.42	0.42
St. Louis	0.175	0.175
Montana—		
Common points	1.00	1.00
Nebraska—		
Omaha	0.42	0.42
Ohio—		
Akron	0.30	0.30
Canton	0.31	0.31
Cincinnati	0.28	0.28
Cleveland	0.30	0.30
Columbus	0.29	0.29
Dayton	0.275	0.275
Mansfield	0.285	0.285
Portsmouth	0.32	0.32
Toledo	0.265	0.265
Zanesville	0.31	0.31
Oklahoma—		
Muskogee	0.69	0.76
Tulsa	0.69	0.76
Oregon—		
Portland		
All rail	1.00	1.00
Rail, river and ocean	0.80	0.80*
South Dakota—		
Aberdeen	0.565	0.565
Tennessee—		
Chattanooga	0.49	0.49
Memphis		
All rail	0.42	0.42
Rail and river	0.35	0.35
Texas—		
Beaumont		
All rail	0.68	0.75
Rivets	0.72	
Rail and river	0.595	0.665
Plates	0.595	
Rivets	0.635	
Dallas	0.84	0.84
Rail, barge, rail	0.75	
Galveston		
All rail	0.68	0.75
Rivets	0.72	
Rail and river	0.595	0.665
Plates	0.595	
Rivets	0.635	
Houston		
All rail	0.68	0.75†
Rivets	0.72	
Rail and river	0.595	0.665
Plates	0.595	
Rivets	0.635	
Utah—		
Common points	0.95	0.95
Washington—		
Common points	1.00	1.00
West Virginia—		
Morgantown	0.36	0.36
Wisconsin—		
Milwaukee	0.08	0.08
Wyoming—		
Casper	0.95	0.95
Sheets thinner than 16-gage	1.00	
Rawlins	0.95	0.95
Sheets thinner than 16-gage	1.00	1.00

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The division of the country into areas of favorable railroad freight rates does not rigidly define the markets tributary to the various basing points. This is true not only because of the lower water rates available to certain sections, but also on account of the different levels of the various bases. The present base prices on mild steel bars are 2c. per lb. at Pittsburgh, 2.10c. at Chicago and 2.15c. at Birmingham. Pitts-

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	Angles, Bars, Channels, Plates, Rivets and Sheets	Beams, Tees and Zees
Alabama—		
Birmingham	$0.53	$0.53
Mobile		
All rail	0.57	0.57
Rail and river	0.47	0.47
Arkansas—		
Little Rock		
All rail	0.51	0.56
Rail and river	0.44	0.49
Smackover		
All rail	0.58	0.63
Rail and river	0.51	0.56
Arizona—		
Phoenix	1.00	1.00
California—		
Los Angeles		
All rail	1.00	1.00
Rail, river and ocean	0.80	0.80
San Francisco		
All rail	1.00	1.00†
Rail, river and ocean	0.80	0.80
Torrence	1.00	1.00
Colorado—		
Denver	0.83	0.83
Pueblo	0.83	0.83
Georgia—		
Atlanta	0.58	0.58
Idaho—		
Common points	1.00	1.00
Illinois—		
Moline	0.155†	0.175
Peoria	0.13†	0.155
Springfield	0.155†	0.175
Indiana—		
Anderson	0.24	0.24
Evansville	0.235	0.235
Fort Wayne	0.22	0.22*
Hammond	0.025	0.025
Indianapolis	0.155*	0.25
Kokomo	0.215	0.215
Muncie	0.25	0.25
South Bend	0.13	0.13
Terre Haute	0.155*	0.235
Iowa—		
Des Moines	0.295	0.295
Kansas—		
Hutchison	0.805	0.805
Plates and sheets	0.765	
Leavenworth	0.42	0.42
Topeka	0.51	0.51
Wichita	0.805	0.805
Plates and sheets	0.765	
Kentucky—		
Ashland	0.32	0.32
Louisville	0.30	0.30
Louisiana—		
New Orleans		
All rail	0.57	0.57
Rail and river	0.47	0.47
Shreveport		
All rail	0.60	0.66
Rail and river	0.51	0.57
Maryland—		
Baltimore	0.535	0.535
Michigan—		
Detroit	0.275	0.275
Flint	0.285	0.285
Minnesota—		
Duluth	0.305	0.305
Minneapolis	0.275	0.275
St. Paul	0.275	0.275
Mississippi—		
Jackson		
All rail	0.53	0.53
Rail and river	0.50	0.50
Missouri—		
Kansas City	0.42	0.42
St. Louis	0.175	0.175
Montana—		
Common points	1.00	1.00
Nebraska—		
Omaha	0.42	0.42
Ohio—		
Akron	0.30	0.30
Canton	0.31	0.31
Cincinnati	0.28	0.28
Cleveland	0.30	0.30
Columbus	0.29	0.29
Dayton	0.275	0.275
Mansfield	0.285	0.285
Portsmouth	0.32	0.32
Toledo	0.265	0.265
Zanesville	0.31	0.31
Oklahoma—		
Muskogee	0.69	0.76
Tulsa	0.69	0.76
Oregon—		
Portland		
All rail	1.00	1.00
Rail, river and ocean	0.80	0.80*
South Dakota—		
Aberdeen	0.565	0.565
Tennessee—		
Chattanooga	0.49	0.49
Memphis		
All rail	0.42	0.42
Rail and river	0.35	0.35
Texas—		
Beaumont		
All rail	0.68	0.75
Rivets	0.72	
Rail and river	0.595	0.665
Plates	0.595	
Rivets	0.635	
Dallas	0.84	0.84
Rail, barge, rail	0.75	
Galveston		
All rail	0.68	0.75
Rivets	0.72	
Rail and river	0.595	0.665
Plates	0.595	
Rivets	0.635	
Houston		
All rail	0.68	0.75†
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Plates	0.595	
Rivets	0.635	
Utah—		
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Washington—		
Common points	1.00	1.00
West Virginia—		
Morgantown	0.36	0.36
Wisconsin—		
Milwaukee	0.08	0.08
Wyoming—		
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burgh's advantage of 10c. per 100 lb. over Chicago and 15c. per 100 lb. over Birmingham increases the territory in which its delivered prices are more favorable than from the other two basing points.

By referring to the map it will be noted that Pittsburgh has increased its area of advantage by taking in most of the lower peninsula of Michigan, all of Ohio and half of Indiana in Chicago territory, and half of Kentucky, all of Virginia and half of North Carolina in Birmingham territory. Chicago's advantage of 5c. per 100 lb. over Birmingham does not expand its territory to any extent. However, by conceding 3c. Chicago can meet Birmingham on an equal basis in most of Arkansas and by conceding 4c. can do the same in Oklahoma and part of Texas.

It is not to be inferred that any of the basing points are at all times rigidly adhered to. In competitive territories mills from all three districts may find it advantageous at times to deviate from their regular prices. Moreover, in the Pittsburgh area along the Eastern seaboard there have been price irregularities.

Deviations from Pittsburgh Base in the East

On plates and shapes Eastern mills have not strictly followed the Pittsburgh prices; in fact, they have frequently named prices which, when figured on a Pittsburgh basis, were several dollars a ton under those named by Pittsburgh mills. This, however, has been due to the predominatingly large plate making capacity in the East and to the eagerness of Eastern mills to obtain all of the business they possibly can in the territory in which they have a freight rate advantage. Only recently Eastern plate mills were quoting on the basis of 1.60c. per lb., Pittsburgh, when Pittsburgh mills were naming 1.80c., Pittsburgh. At the present time, with plate business better than it has been in a year, the prices of Eastern mills are $2 to $3 a ton below Pittsburgh mill prices. This distinction between the Pittsburgh and Eastern mills on plates existed even before the acceptance by the Steel Corporation of the Pittsburgh plus decision, so it cannot be said that the decision has had any material effect on the situation.

On structural shapes the situation has been slightly different, because of the fact that the Steel Corporation has a shape mill in the East (Pencoyd, Pa.), which sells some of its product in the open market through the Carnegie Steel Co. Following its custom in other districts, the Steel Corporation has established a separate mill base for its Pencoyd mill, but the same prominence has not been given to its quotations from that point as from Chicago or other district mills. The fact remains, however, that because of the absorption by the Corporation of some of the freight from Pittsburgh, which other mills aim to get, the market on shapes in the East, but most particularly in the immediate Philadelphia territory, has been to some extent affected by the Pencoyd quotations. That this mill has not been a larger factor is due to the relatively small amount of steel it has for sale.

In sheets, as in bars, Pittsburgh has an advantage of 10c. per 100 lb. in base price over Gary and Indiana Harbor, so that much the same situation as to delivered prices obtains as on bars, although freight rates are not in all cases the same.

Complex Situation in Wire Products

In wire products the situation is much more complicated in view of the large number of basing points. It was found by a Pittsburgh company specializing in wire products that the average net mill price on shipments to all parts of the country was just about $1 a ton lower under delivered price quotations than at Pittsburgh plus prices. This calculation embraced an absorption of 19c. per 100 lb. or $3.80 per ton on shipments based at Cleveland and the absorption of the difference between the freight and the differentials over Pittsburgh on shipment based on other producing centers.

The Steel Corporation, as the defendant in the Federal Trade Commission action and alone obliged to accept its decision, established basing points on its several products at its several points of plant location. It was thought that in naming prices for sheets and tin plate at $2 a ton over Pittsburgh at Gary, wire products at $2 over Pittsburgh at Chicago district mills, $3 over Pittsburgh at Worcester, Mass., and Birmingham, and $4 over Pittsburgh at Duluth, and $2 a ton over Pittsburgh at Gary and $3 over Pittsburgh at Birmingham for plates, shapes and bars, the Corporation was cutting the cloth rather tight for the independents and that these differentials, in all cases much less than the freight from Pittsburgh to those points, would leave the independent companies on the outside until the Corporation subsidiaries had become filled up. It did not work out that way, because the independents were not to be deprived of the reward of years of effort in building consuming connections. In wire products, the differentials have been reduced except at Worcester and Birmingham. Duluth now has prices only $2 a ton over Pittsburgh on wire products, while the differential over Pittsburgh at Chicago, and this means Chicago delivery as well as mill prices, is only $1 a ton, except on woven wire fence.

How Consumers Are Affected by Plural Basings

The plural basing points have introduced complications for consumers also. At its Worcester, Mass., plant, for example, the American Steel & Wire Co. has quoted 2.65c. per lb., f.o.b. works, on plain wire, as compared with 2.50c., Pittsburgh. This has resulted in several interesting complications affecting the prices which wire consumers must pay. For example, a consumer at Lynn, Mass., if buying from the Worcester mill, would get a quotation of 2.65c., Worcester, plus a freight rate of 10c. per 100 lb., making a delivered price of 2.75c. A Pittsburgh independent wire mill, to meet this competition, finds it necessary to make the same delivered price, which nets the Pittsburgh manufacturer only 2.385c., mill, a concession of .115c. per 100 lb.

Such a shipment of wire going from Pittsburgh to Lynn might pass through Bridgeport, Conn., traveling some 150 miles farther before its gets to Lynn; yet a Bridgeport consumer would have to pay 2.865c. per lb. either from Worcester or Pittsburgh, or .115c. per 100 lb. more than a Lynn consumer would have to pay for the same product. At points a little farther west, such as Albany, N. Y., for example, the advantage lies with the Pittsburgh or Cleveland mills.

A like situation has developed in the Cleveland territory, where the American Steel & Wire Co. quotes the same prices as from Pittsburgh. With a 2.50c. price at Cleveland, a Cleveland buyer of wire has an advantage of nearly $5 a ton over a Buffalo consumer, the difference being made up by the freight rate from Cleveland to Buffalo. Although the distances from Cleveland to Buffalo and from Pittsburgh to Buffalo are approximately the same, the freight rate from Cleveland is 23c. per 100 lb., while from Pittsburgh to Buffalo it is 26½c. If the situation existing in wire products were to be found in all steel products, a greater concentration of manufacturing activities near sources of supply would be a logical development.

The effect of this situation on the consuming trade has apparently not been all that was hoped for by some of the ardent advocates of the abolition of Pittsburgh basing. For example, it is to be presumed that the plant of the American Steel & Wire Co. at Worcester cannot take care of all the consuming demands of that territory. Therefore, one fabricator of wire in or near Worcester might get his supply of wire at considerably less than a competitor, assuming that one got his supply from Worcester and the other from Pittsburgh or Cleveland without concessions on the part of the latter mills.

Chicago Base on Pipe Applies in Small Area

On steel pipe Chicago district mills have an advantage in delivered prices only in a very small part of the country. Pittsburgh and Lorain, Ohio, mills quote the same base price, while Chicago district mills quote $4 a ton higher. In actual practice, however, it is seldom that the Chicago district mills are able to obtain all of this differential over Pittsburgh and Lorain mills

Rates Per 100 Lb. on Wire and Wire Products from Western Mills

Destination	Producing Points: Joliet, Ill.	Waukegan, Ill.	De Kalb, Ill.	Duluth, Minn.
Arkansas—				
Little Rock	$[3]0.535	$[3]0.535	$0.535	$0.765
California—				
Los Angeles	[1]1.00	[1]1.00	[1]1.00	[1]1.00
San Francisco	[1]1.00	[1]1.00	[1]1.00	[1]1.00
Colorado—				
Denver	0.84 wire 1.02 w.w. fence and wire mesh	0.84 wire 1.02 w.w. wire and wire mesh	0.84 wire 1.02 w.w. fence and wire mesh	0.84 wire 1.02 w.w. fencing and wire mesh
Illinois—				
Moline	0.215	0.215	0.175	0.305
Peoria	0.175	0.175	0.155	0.305
Rock Island	0.215	0.215	0.175	0.305
Indiana—				
Indianapolis	0.25	0.28	0.27	0.485
Iowa—				
Davenport	0.215	0.215	0.175	0.305
Des Moines	0.295	0.295	0.295	0.305
Waterloo	0.275	0.275	0.275	0.305
Kansas—				
Topeka	0.51	0.51	0.51	0.57
Wichita	0.69	0.69	0.69	0.83
Michigan—				
Detroit	0.275	0.305	0.31	0.52
Flint	0.285	0.32 all rail	0.325	0.46
Grand Rapids	0.26	0.29 all rail	0.305	0.48
Jackson	0.255	0.285	0.29	0.48
Kalamazoo	0.22	0.25	0.27	0.48
Minnesota				
Minneapolis	0.275	0.275	0.275	0.155
St. Paul	0.275	0.275	0.275	0.155
Missouri—				
Kansas City	0.42	0.42	0.42	0.475
St. Louis	0.215	0.215	0.215	0.395
Montana—				
Butte	1.30 w.w. fencing 1.00 wire 1.25 wire mesh reinforcing	1.30 w.w. fencing 1.00 wire 1.25 wire mesh reinforcing	1.30 w.w. fencing 1.00 wire 1.25 wire mesh reinforcing	0.90 wire 1.17 w.w. fencing
Nebraska—				
Lincoln	0.47	0.47	0.47	0.465
Omaha	0.42	0.42	0.42	0.47
North Dakota—				
Fargo	0.57	0.57	0.57	0.39
Ohio—				
Cincinnati	0.28	0.31	0.30	0.555
Oklahoma—				
Muskogee	0.69	0.69	0.69	0.825
Tulsa	0.69	0.69	0.69	0.825
Oregon—				
Portland	[1]1.00	[1]1.00	[1]1.00	[2]0.90
South Dakota—				
Aberdeen	0.51	0.51	0.51	0.45
Tennessee—				
Memphis	0.42	0.45	0.42	.....
Utah—				
Salt Lake City	[3]0.95	[3]0.95	[3]0.95	[3]0.95
Washington—				
Seattle	[1]1.00	[1]1.00	[1]1.00	[2]0.90
Spokane	[1]1.00	[1]1.00	[1]1.00	[2]0.90
Wisconsin—				
Green Bay	0.205	0.205	0.205	0.275
Madison	0.115	0.115	0.115	0.305
Milwaukee	0.08	0.08	0.205	0.275
Manitowoc	0.205	0.205	0.115	0.305

[1]—Rate on woven wire fencing, $1.30; wire mesh reinforcement, $1.25.
[2]—Rate on woven wire fencing, $1.17; wire mesh reinforcement, $1.13.
[3]—Rate on woven wire fencing, $1.28; wire mesh reinforcement, $1.25.
[4]—Rate on woven wire fencing, $0.535; wire mesh reinforcement, $0.51.
[5]—Wire mesh, $0.51.

because of the working out of freight rates, which are frequently to the advantage of the Lorain mill, even in Chicago trade territory, considering the difference in the published prices. It is the custom of the National Tube Co., which has mills at Pittsburgh, Lorain and Gary, to bill from the point having the lowest freight rate to destination, regardless of the mill from which the shipment is made. The Youngstown Sheet & Tube Co., which has two pipe mills in the Chicago district, naturally has to meet the delivered prices of the National Tube Co. on competitive business.

A few examples will serve to illustrate the point. Green Bay, Wis., is a city that logically draws upon Chicago mills for its steel. Yet the Lorain mill can ship pipe to Green Bay at 37½c. per 100 lb., as against 20½c. from Chicago. Taking into consideration the $4 per ton higher price at Chicago mills, producers of that district must make a concession of 60c. a net ton to meet the delivered price from Lorain. In a similar manner Chicago mills are at a disadvantage as compared with Lorain at such nearby points as Peoria, Springfield and Moline, Ill., Davenport and Waterloo, Iowa, and St. Louis.

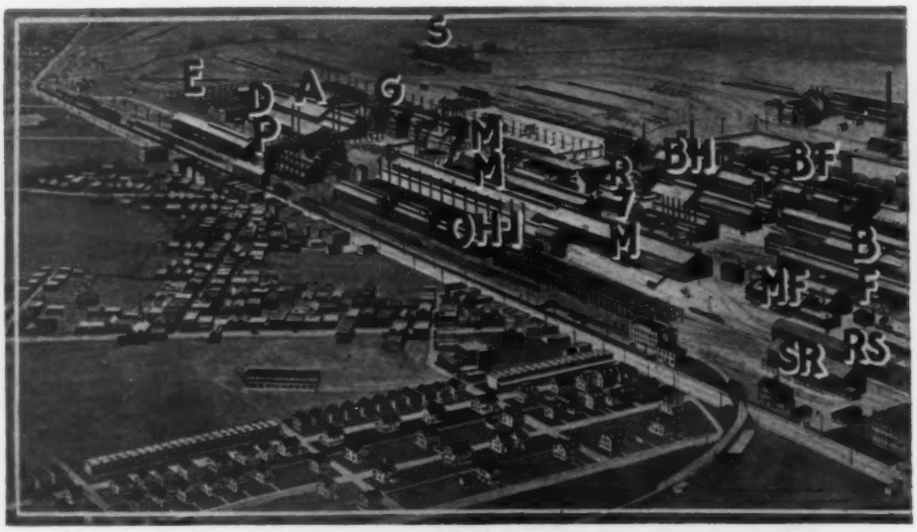
In Texas and Oklahoma, districts which consume large quantities of pipe, Chicago mills are at a slight disadvantage, always considering, of course, the difference in base price. In shipping to Houston, Tex., Chicago mills pay a rate of 49c. per 100 lb., as against 65½c. from Lorain, and here it is again necessary for Chicago mills to make a slight concession in price. At San Antonio, Dallas, Waco and Wichita Falls there is an advantage of 5c. per 100 lb. in favor of Lorain on delivered prices. Tulsa, Okla., has a rate of 79c. from Lorain and 60c. from Chicago, making it necessary to slice 1c. per 100 lb. from the Chicago mill price to meet the Lorain delivered price. About the same situation exists on shipments to other Oklahoma points.

Although Chicago mills can ship to San Francisco and Los Angeles by rail at a lower rate than is applied on Pittsburgh shipments, the rail and water rate from Pittsburgh is to the advantage of that district, from Pittsburgh to San Francisco being 66c. as against 70c. from Chicago, while to Los Angeles the rate is 70c. from Pittsburgh and 76c. from Chicago. Even at Western interior points the Chicago mills have no advantage that will permit them at all times to obtain their full price plus freight. The rate from Pittsburgh and Lorain to common points in Utah is $1.15, while from Chicago it is 95c. to $1. Thus, even in shipping to that State the Chicago mills must adjust their mill price slightly downward in some cases to meet competition.

Multiple basings have made a knowledge of freight rates far more important to a clear understanding of the steel market. They have also resulted in efforts to alter present rate relationships. In the Jones & Laughlin Steel Corporation case, which has not yet been brought to a definite conclusion, the Pittsburgh district asked for a reduction in the fifth-class rates from Pittsburgh and an advance in the commodity rates on steel from Chicago to points in Indiana and southern Illinois. The Chicago district is still attempting to obtain Fourth Section relief in connection with rates to the Pacific Coast.

Modernization at Bethlehem's

New Coke Ovens, Blowing Engines, Two Structural Mills and Scrap Plant



A—New 35-In.-28-In. Structural Mill; B—Bessemer Steel Works; BF—Blast Furnaces, Alongside Ore-Ship Channel; BH—Blowing Engine House No. 3 (New Engines); BY—By-Product Recovery Plant (Rebuilt); C—Coke-Oven Plant (Largely New); D—New 18-In.-14-In. Mill; E—New Shipping Yard for Finished Steel; F—Foundry; G—Structural

UPON the acquisition of the Lackawanna, Cambria and Midvale properties in 1922 and 1923, the Bethlehem Steel Corporation undertook a construction program contemplating the modernization and development of the newly acquired plants to effect important economies in operation, and also the addition of finishing capacities both at these and at its other plants.

This program, involving the expenditure of over $80,000,000, a generous portion of which was assigned to the Lackawanna Plant, is now nearing completion. The rebuilt open-hearth furnaces at the Lackawanna Plant started making steel in October. The first of the new structural mills went into scheduled operation on Dec. 14. The second of the new mills is nearing completion and will be in operation early in the spring, while the coke oven plant, the scrap reclaiming plant and the rebuilt blooming mill have been operating for some time.

Removal of the Lackawanna Iron & Steel Co. from Scranton, Pa., to a tract of 1000 acres, immediately south of the city line of Buffalo and fronting on Lake Erie, was made at the end of the last century. The plot has an average width of 3000 ft. and is more than three miles long. Its location enables it to obtain its ore from the ranges in the Great Lakes district, with an all-water haul direct from the upper lake ports to its own docks. It is likewise advantageously located for shipping its products, having access through the Erie Canal to New York for local eastern and foreign markets, as well as shipment by rail to New England, and by rail or water to Detroit, Cleveland, Chicago and other important consuming centers along the Great Lakes, and to the northwestern markets of St. Paul and Minneapolis.

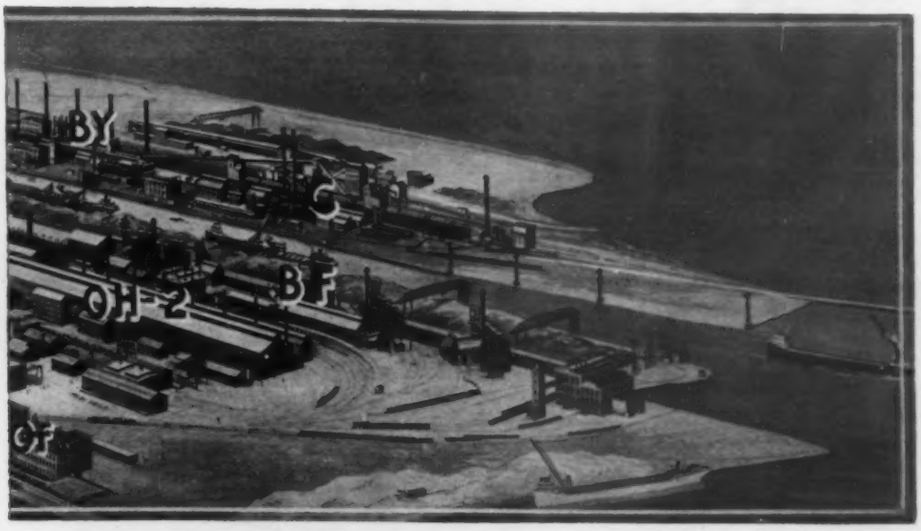
The new and rebuilt units making up the modernization program nearing completion at the Lackawanna plant, which are described in the following paragraphs, put the plant in a thoroughly modern condition capable of most economical operation; thus bringing to realization the actuating motives back of the new developments.

New Coke Ovens

Ten old batteries of by-product coke ovens, each containing 47 retorts, and one Solvay by-product bat-

Pusher Side of Koppers Coke Ovens, with Semet-Solvay Ovens at Extreme Right. The coal hoppers, with conveying system, appear above the ovens, as does the gas main. The short, thick stack alongside coal hoppers serves the quenching station. The top of its mate is barely visible

Lackawanna Steel Works



Rebuilt Open-Hearth Furnaces and Blooming Mill —Extensive Electrification

Mills; M—Merchant Mills; MF—Machine and Forge Shops; 7—Blooming Mill No. 7 (Rebuilt); Of—Main Offices; OH1—Open-Hearth Steel Works No. 1 (Rebuilt); OH2—Open-Hearth Steel Works No. 2; P—Plate Mill; R—Rail Mill; RS—Roll Shop; S—Scrap Reclaiming Plant (New); SR—Structural Repair Shop

tery of 60 retorts, gave a total capacity of 66,000 tons of coke per month. The old coke ovens included 188 of the Otto-Hoffman type and 281 Rothberg ovens. Five of the old batteries have been torn down to make way for new construction; the remaining five are being dismantled.

Two new batteries of Koppers ovens, Becker type, of 57 ovens each, have been built and are operated together as one unit, while the 60 Solvay ovens installed in 1920 are operated as a separate unit. The monthly capacity of the 174 ovens in these two units is about 75,000 gross tons of coke from the use of 105,000 gross tons of coal. The new Koppers ovens are running on a schedule of about 11½ hr. between charges, and are so operated that one oven is pushed about every 6 min. This rapid operation is attributed to the new narrow type of oven.

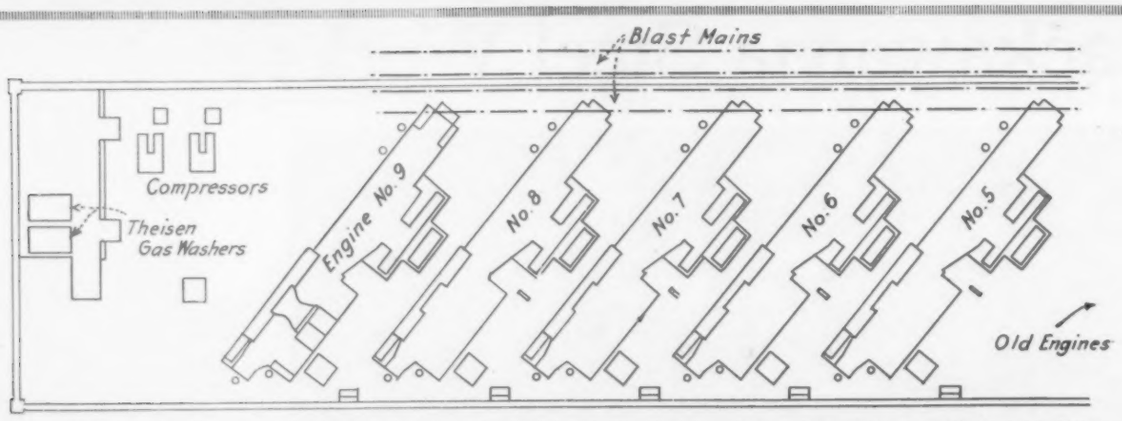
About 30,000 lb. of coal per oven is charged into each of the Solvay ovens, which have a coke schedule of some 16½ hr. This means 1800 lb. per oven per hr. In the new Koppers ovens the charge is 24,000 lb. per oven but, as the operating schedule is 11½ hr., the output per oven becomes 2100 lb. per hr. The new ovens were first placed in operation on Sept. 3, 1924.

Part of the by-product reclaiming system is new, use having been made of as much of the old system as could be worked into the new scheme. After passing the primary coolers, which are new, the gas goes from the (old) exhausters into the tar extractors. The saturators for obtaining direct ammonium sulphate are new, while one new still and condenser form a portion of this part of the plant. Six new centrifugal machines reclaim the ammonium sulphate.

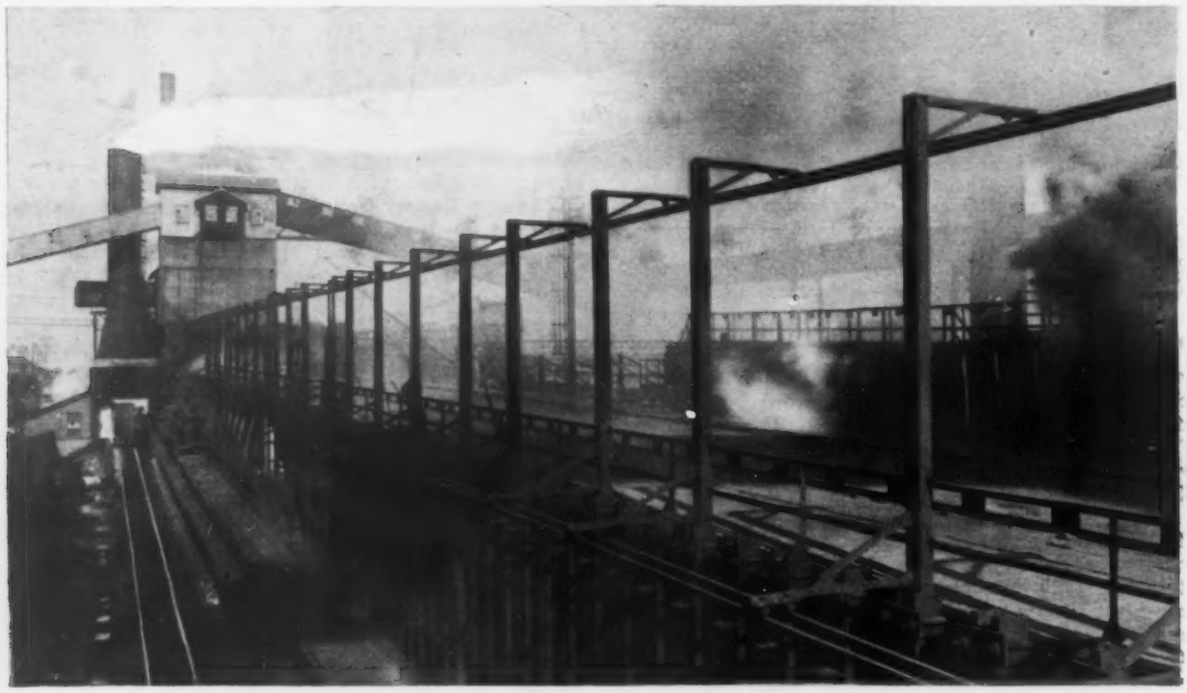
All the gas from the saturators goes to the benzol plant, passing through water coolers on the counter-current principle. This plant was all rebuilt, and the scrubbers well equipped with new grids. There are three of these in series, operating counter current with wash oil. This oil, on returning bensolized to tanks, is later distilled for motor fuel, benzol, tuluol, zylol, solvent naphtha, etc.

About 40 per cent of the gas produced in the coke ovens is used as fuel gas to heat the ovens. The remaining 60 per cent is available for the heating furnaces of the mills, for soaking pits and for a portion of the rebuilt open-hearth plant. None is used under

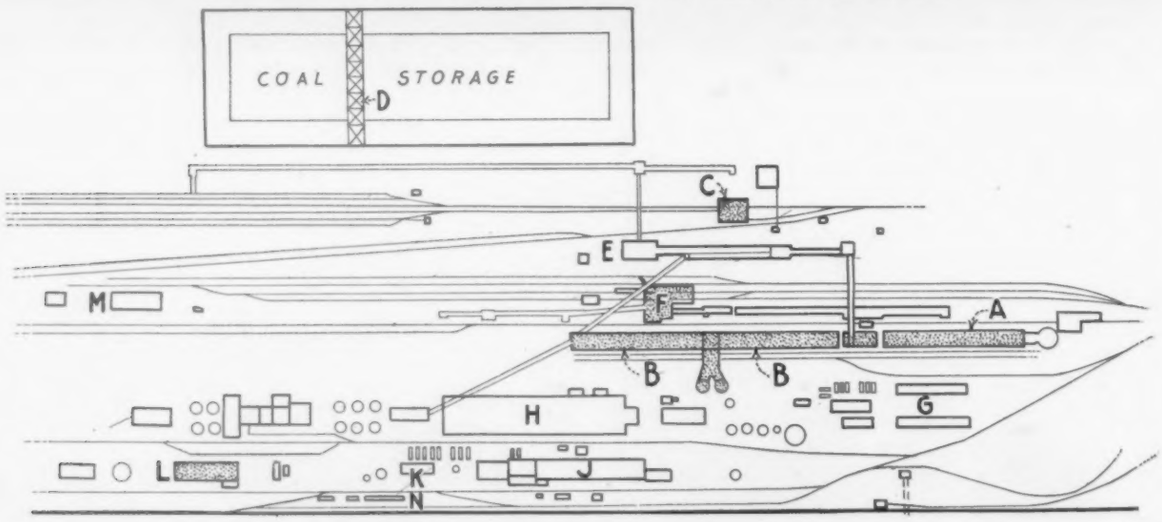
Coal Handling and Storage Plant at West Side of Coke Oven Group. The bridge has a span of 300 ft. and a travel of about 1000 ft. Its capacity is 5½ tons. Storage capacity is 200,000 tons. Coke screening station appears under bridge; at left is coal tower for feeding coke ovens



Layout of Southern Portion of Blowing Engine House No. 3, Comprising About Two-Thirds the Entire Length. Engines Nos. 5 to 9 are in position and at work. Nos. 1 to 4 are to replace the old Koerting engines at north end of building



Coke Side of the New Koppers Ovens. At left in distance a car of new coke is being quenched. The steam drawn up the stacks is blown east by wind from off the lake



Layout of Coke Oven Plant. Top of drawing is west. The principal units are listed:

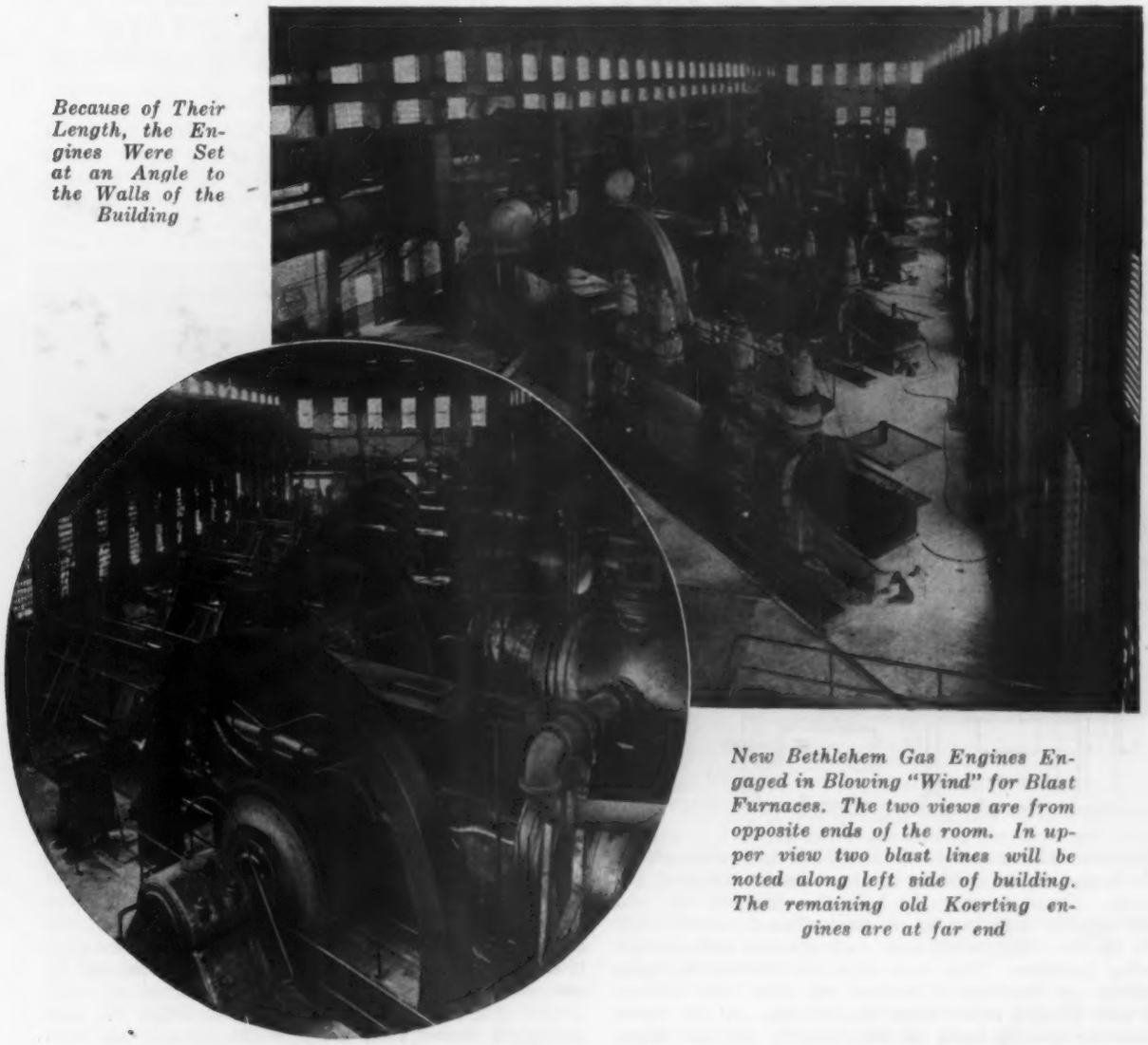
A—Semet-Solvay Ovens
B—Koppers-Becker Ovens
C—Car Dumper
D—Coal-Handling Bridge
E—Coal Breaker
F—Screening Station
G—Cooling Coils
H—Condenser and Ammonia House
J—Benzol Plant
K—Oil Coolers
L—Gas Booster House
M—Repair Building
N—Rail Loading Dock

boilers, as it is felt that better overall economy can be obtained by the use which is being made of it. A new gas booster was installed to force the gas to the furnaces and other parts of the plant where it is to be used as fuel.

One new portion of the coke oven plant is a screening station of great flexibility, while the old screening station was remodeled. The quenching house for the two Koppers groups has two stacks which, by natural draft, pass off into the upper air all the steam produced, thus saving the life of the steel work in the immediate vicinity.

Coal handling equipment for all three batteries of ovens is new. The storage space, calculated for 200,000 tons, is spanned by a Wellman-Seaver-Morgan Co. traveling bridge of 5½-ton capacity, with a span of 300 ft. and a travel of about 1000 ft. Coal coming in (it all comes in on cars) enters a car-dumper of the barrel type, capable of handling a 120-ton car. From the track hopper the coal is elevated by belt conveyor to a tower and from the tower it may go either directly to the ovens or into storage. Use of the bridge, of course, renders the system flexible and permits handling the coal according to the needs of the moment.

Because of Their Length, the Engines Were Set at an Angle to the Walls of the Building



New Bethlehem Gas Engines Engaged in Blowing "Wind" for Blast Furnaces. The two views are from opposite ends of the room. In upper view two blast lines will be noted along left side of building. The remaining old Koerting engines are at far end

New Gas-Driven Blowing Engines

Five old Koerting blowing engines have been removed and scrapped to make way for a similar number of new blowing engines. Three remaining Koerting engines, in the same blowing house, are scheduled for early removal, when four new engines will take their place. The five new engines, which are of Bethlehem design and manufacture, are horizontal and are depended upon to furnish blast for two furnaces and half that for a third. This is accomplished on the same consumption of blast furnace gas as was formerly required to blow one blast furnace with three of the old engines. The new engines, which are run at about 65 r.p.m., have gas cylinders 47 in. in diameter and (in tandem) air cylinders 84 in. in diameter. The stroke is 60 in.

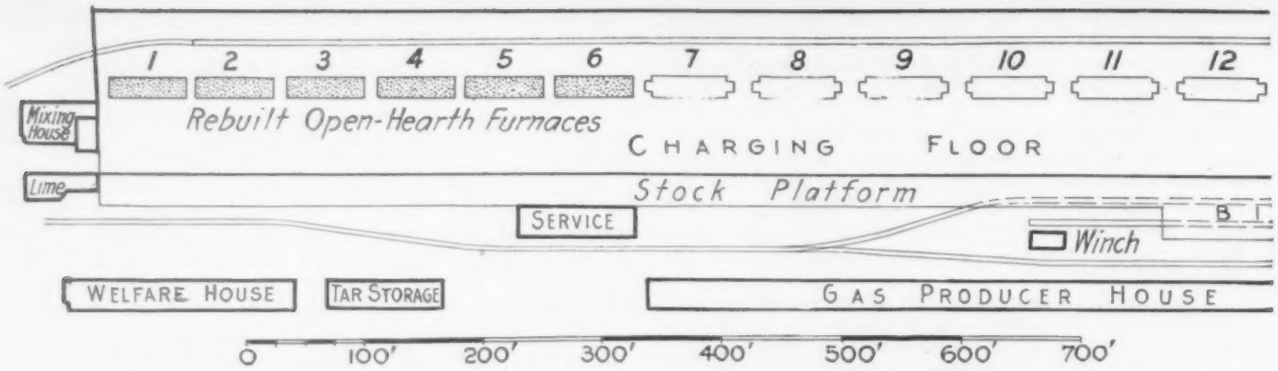
In spite of the cleaning which the gas obtained on leaving the blast furnaces, there still remains in it enough dust and other sediment to cause trouble by gumming up the engine valves or scoring the cylinders. Consequently two secondary washers of the Theisen type have been placed in the engine room. These operate at a peripheral speed of about 5000 ft. per min. and, using only a small quantity of water, remove nearly all of the residual dust. So efficient have they proved that no dust trouble has been experienced.

Flexibility is provided by the manner of tying up the cold blast mains. The scheme provides for cross connections, both inside and outside this blowing engine house, between mains going to different furnaces. When the change has been completed, and nine of the new engines are at work, it will be possible to use any engine or any group of engines on any one of the furnaces or group of furnaces included in this particular tie-up.

Changes at No. 1 Open-Hearth

Fourteen open-hearth furnaces in the plant known as No. 1 open-hearth steel works consisted of six 60-ton stationary furnaces designed and installed by Alex Laughlin & Co., Pittsburgh, in 1902, five 100-ton furnaces built about 1907 and three additional 100-ton furnaces built in 1911.

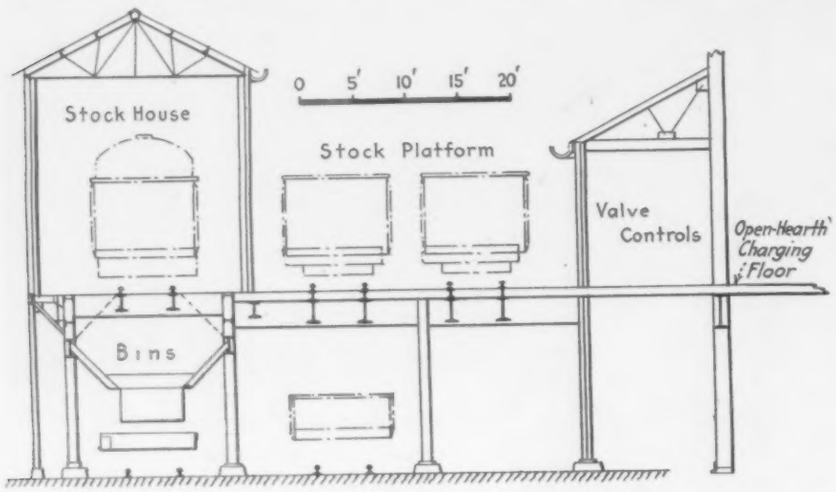
A portion of the reconstruction program involved



General Layout of No. 1 Open-Hearth Steel Works as Rebuilt. The new stock yard at right, with four 10-ton cranes and six standard gage railroad tracks, takes the place of a cramped yard formerly located between the

entire rebuilding of the six old Laughlin furnaces. Because of the fact that these are now designed to operate on coke oven gas or tar or both, it was possible to install 100-ton furnaces in the space (73½ ft. centers) formerly occupied by the 60-ton units. Only a single uptake and regenerator chamber at each end is needed, because the fuel does not have to be heated, hence the familiar "dog house" is omitted. These furnaces have been completed and are in operation.

Rebuilding of this group of furnaces necessitated partial rebuilding of the entire structure housing all fourteen furnaces. In the first place the hot metal track had to be strengthened, to carry the heavier



Section of New Stock Platform at Rear of Open-Hearth Charging Floor. The bin house handles limestone, dolomite, fluorspar and other materials. Scrap is loaded elsewhere and brought up to the tracks on stock platform for delivery to the furnaces

charges. This was done from the 600-ton mixer at the north end of the building to the dolomite house at the south. Crane runways on both the charging side and the tapping side had to be strengthened considerably for the new equipment, new crane girders and columns being installed. This was required because the ladle cranes are handling a heavier load than ever before. A new 165-ton ladle crane was put up. At the same time the heavier loads on the charging side are being handled with a new 75-ton hot-metal crane. Both these new cranes are of Alliance make. One new 10-ton Whiting jib crane was installed at each furnace, to handle the spout, etc.

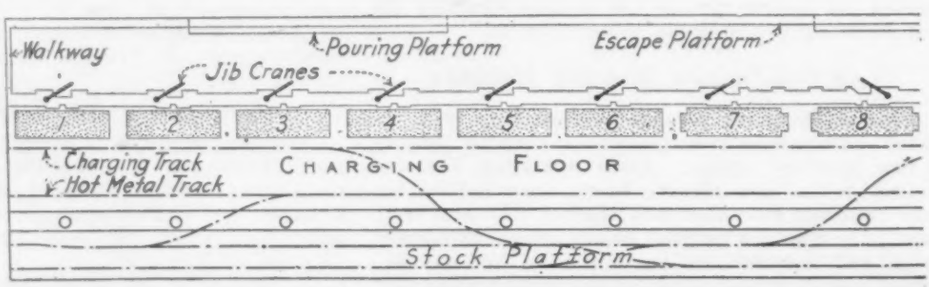
Formerly the ladle cranes in this building had the cages on the furnace side of the bay. From this position a better view was had of the teeming of ingots, but considerations of safety for the men and other reasons dictated shifting all these cages to the pouring side of the bay.

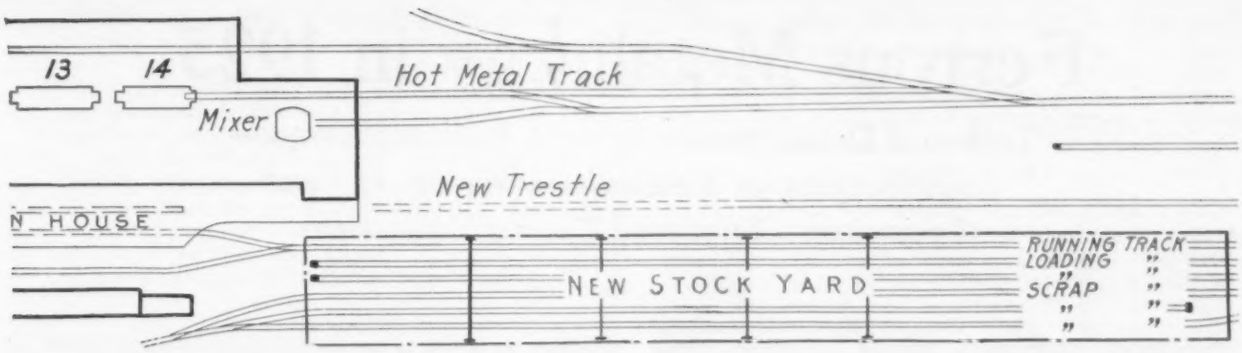
Three new pouring platforms were installed, one at either end and one at the middle of the length on the west side of the shop. An escape platform running the entire length of the shop, on a level with the floor of the ladle crane cages, was put in, to permit the crane operators, in case of a spill, to get away. Both ends of the escape platform are connected with the charging floor by walkways, at the extreme ends of the building.

Previously the stockyard was immediately east of the building and extended its full length. A single track outside the building, on charging floor level, took care of charging box cars. Boxes were hoisted to that point and placed on cars by the use of the stockyard cranes, while boxes for scrap were loaded either on the ground or on the upper level by means of a magnet. If loaded on the ground, they had to be hoisted one by one and placed on the cars on the upper level.

All this now has been done away with. A new stockyard, immediately north of the old one, has been established, with four 10-ton cranes of 90-ft. span for handling scrap and other materials. There are six parallel tracks running the length of this yard, three for railroad cars, two for scrap and other buggies with charging boxes being loaded, while the westerly track is the running track for drags of material to be charged into the furnaces.

Rebuilt Open-Hearth Steel Works No. 1, Showing Location of New Stock House, Pouring and Escape Platforms and Tracks. Dot-and-dash lines show track centers, indicating the system of cross-overs which makes for flexibility in operation





gas producer house and the charging floor. Furnaces Nos. 1 to 6 were entirely rebuilt to a much larger size and the whole structure strengthened and renovated. New ladle and hot-metal charging cranes were installed

Connection between the stockyard and the open-hearth charging floor level is by means of an embankment and a trestle. On passing from the stockyard to the trestle track the cars go over a Strait Scale Co. railroad track scale of 150-ton capacity, on which they are weighed, four at a time. This scale has unusually complete and adequate ventilation and drainage system. Two new 85-ton standard-gage locomotives are used.

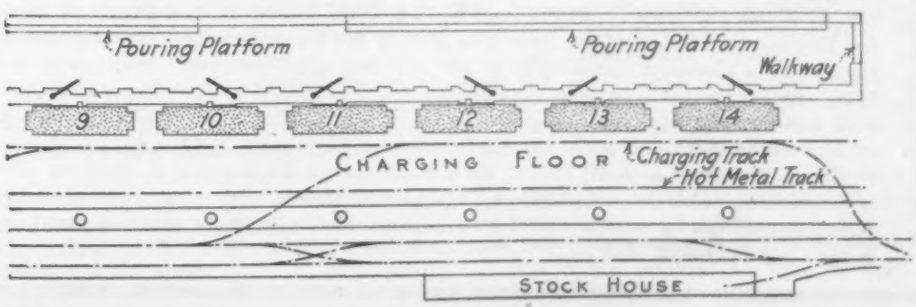
On the upper level, outside the building, are now three tracks in place of the one originally, two of them running full length. Crossovers and other switching facilities have much simplified the operation of charging each furnace while carrying on other operations at other furnaces. One of the upper level tracks is over a system of stock bins for limestone, ore, fluorspar and other similar materials, the cars dumping directly into the bins. On the lower level, beneath the bins, is a track handling charging box cars, which are hauled back and forth by a car haul with distant control. Loading is by the usual gate method at each bin.

For tar storage two large tanks have been placed in one end of the old producer gas house, the producers having been removed. Two pumps with interconnecting valves send the material to the furnaces as required. The tar is kept at a definite temperature and pressure. Producers still are used for furnaces No. 7 to No. 14, but approximately one-half of the entire producer plant was dismantled when the six furnaces were rebuilt for use of the fluid fuel.

Blaw-Knox damper type reversing valves, electrically operated, are used in conjunction with the newly built furnaces. These take the place of the old mushroom type Lackawanna valves which formerly were used for these furnaces and which still are used for the eight furnaces which were not rebuilt. All hydraulic door hoists on the stationary furnaces in both No. 1 and No. 2 open-hearth shops have been replaced by motor operated equipment.

Charging Floor of Rebuilt Open-Hearth Plant, Showing No. 2 Furnace in Foreground and Nos. 3 to 6 Beyond. All the flooring and its supports, crane runways and columns and many other structural features are new. Six furnaces, on rebuilding, were enlarged from 60 to 100 tons capacity and fitted for using tar or coke oven gas as fuel for melting and refining

(To be concluded)



New Stock Platform, with Two Tracks the Entire Length, Is a Feature of the Rebuilt Plant. The 600-ton mixer, shown in the cut at top of page, is at extreme right, near furnace No. 14. New cranes were installed in both bays

Ferrous Metallurgy in 1925

Technical Developments in Steel, Iron and Alloys—Contributions of Research—Progress in Heat Treatment—Improved Testing Equipment

BY H. M. BOYLSTON

DEVELOPMENTS in ferrous metallurgy during 1925 have been varied and numerous. Continued efforts have been made to improve methods for the beneficiation of iron and manganese ores. Improvements for the blast furnace have been suggested and a method for mechanically repairing the sides and bottom of the open-hearth furnace has been devised and put into operation. A new pyrometer has appeared and two new binocular microscopes have been placed on the market for the study of sands, ores and the macrostructure and fractures of metals. A commercial method for the manufacture of electrolytic iron tubes and sheets from impure blast furnace pig iron has been established, and many important researches have been reported concerning the physical properties of steels and their metallography and heat treatment. Space is available only for a brief reference to the more important of these developments.

Iron and Manganese Ores

C. Japffe in a paper entitled, "Manganiferous Iron Ores of the Cuyuna District, Minnesota" (*Mining and Metallurgy*, November, 1925), pointed out that there are two principal classes of these ores, described the previous production and pointed out that ample reserves are available for some time to come.

C. P. McCormack in his paper entitled, "Economics of the Cuyuna Manganiferous Iron Ores" (*Mining and Metallurgy*, May, 1925), pointed out that these ores can be a principal source of manganese for the iron and steel industry in the United States when metallurgical methods are adjusted as a whole, so as to use run-of-mine ore.

Lake Superior iron ore prices were established for 1925 at a reduction of 50c. a ton for non-Bessemer ores, making it the lowest price since 1916. On Bessemer ores the reduction was from 60 to 61c. per ton, and the Bessemer differential on iron content was wiped out.

Refractories

The American Refractories Institute was organized at a meeting held at the Mellon Institute of Industrial Research in April to encourage cooperation between manufacturers and consumers of refractories, and for studying materials going into the manufacture of refractories, the thermal conductivity of refractories and determination of heat absorption and radiation, and the reason for spalling in present day silica and clay brick.

Sponge Iron

Further work has been done in the production of sponge iron at the Northwest Experiment Station of the United States Bureau of Mines by E. P. Barrett and B. M. Larsen. The object of this work is to develop a commercial method for the production of sponge iron, which can be used either as a reagent for precipitating metals such as lead, copper or silver from solution, or as a cheap form of metal for conversion into iron or steel by melting.

Blast Furnace Design and Operation

The new No. 2 blast furnace of the Indiana Harbor Works, Youngstown Sheet & Tube Co., was blown in March 23, 1925. The stack is rated at 700 tons and has a height of 95 ft., a bosh of 24 ft. and a hearth of 20½ ft., a working volume of 28,690 cu. ft., and is fitted with 16 tuyeres. The skip incline is supported independently of the shell and the coke screening facilities are unique. The four stoves are of side-combustion 2-pass design and the linings include Celite insulation brick. Blast is furnished by an Ingersoll-Rand turboblower of a 4-stage design, driven by a 7-stage impulse turbine and capable of supplying 60,000 cu. ft. of free air per min. at a pressure of 30 lb. A McKee type revolving distributor was included. (*Iron Trade Review*, Dec. 3, 1925, page 1401).

S. P. Kinney and F. B. McKenzie have proposed a new design of blast furnace hearth and bosh construction, involving elliptical or similar sections, for obtaining high combustion efficiency. (THE IRON AGE, Feb. 12, 1925, page 476).

R. A. Sherman (THE IRON AGE, April 9, 1925, page 1043), published the results of experiments to determine the combustibility of blast furnace coke, main-

HERBERT M. BOYLSTON, head of the department of metallurgical and mining engineering Case School of Applied Science, Cleveland, received the degree of B. S. in chemistry, cum laude, Harvard University, in 1903, *and his M. A. from the same university in* 1905. *From* 1903 *to* 1905 *he was assistant in metallurgical chemistry at Harvard and served as private technical assistant to Dr. Henry M. Howe from* 1905 *to* 1906. *Teaching metallurgy and metallography under Dr. Albert Sauveur from* 1906 *to* 1912, *he became a partner in the consulting firm of Sauveur & Boylston in* 1909. *In* 1908, *collaboration with Dr. Sauveur resulted in the publication of their book, "Laboratory Experiments in Metallurgy," and in* 1912 *"The Metallography and Heat Treatment of Iron and Steel." Since* 1913 *he has been active in committee work for the American Institute of Mining and Metallurgical Engineers, the American Society for Testing Materials and the American Society for Steel Treating. He was awarded the Carnegie Research Scholarship of the Iron and Steel Institute (British) in* 1915-1916. *He wrote the iron and steel section for Mark's Mechanical Engineers' Handbook and has published articles in the technical press. For* 19 *years he has conducted many metallurgical investigations, especially metallographic work, and has been an expert in a number of legal cases. He has conducted the Sauveur & Boylston correspondence course in the metallography and heat treatment of iron and steel since* 1909, *giving instruction by mail to over* 1000 *students. He accepted the chair of metallurgy in the Case School in* 1920.

taining that an accurate measure of the combustibility of coke under the conditions mentioned can be determined by the composition of the gases leaving a fuel bed of given thickness and of a given size of coke. The combustibility is determined as a percentage of the maximum obtainable combustibility.

W. G. Imhoff and D. E. Ackerman, (THE IRON AGE, Jan. 15, 1925, pages 203 to 211), have developed a research method for use at blast furnaces. By a system of special code symbols for designating observed conditions in the iron, slag, smoke, etc., a complete record of every cast can be made for later study.

Ferroalloys

T. Swann (*Mining and Metallurgy*, January, 1925,) calls attention to the production of ferrophosphorus in electric furnaces and points out that there are two grades, one containing 17 to 19 per cent, and the other 23 to 25 per cent phosphorus, and that these alloys are having an increasing use in the steel industry.

The committee on ferroalloys of the American Society for Testing Materials presented, at the annual convention in June, new specifications covering the leading alloys in this field. These are being considered by the committee.

The Foundry

Sand problems and foundry costs held the center of the stage at the annual convention of the American Foundrymen's Association in Syracuse in October, 1925. There were over 60 papers presented at the convention, which was also marked by one of the largest exhibits since the war, the floor space occupied being approximately 57,000 sq. ft.

R. A. Fiske (THE IRON AGE, Nov. 19, 1925, page 1383), describes a scheme for the hydraulic washing of heavy castings to remove molding sand, thus saving much time and foundry floor space. The process recovers practically all of the core and surface sand and a great deal of the core iron which is not damaged by the process.

H. W. Dietert and William Myler have devised a method of recording the temperatures of molten cast iron as it issues from the cupola by placing a thermocouple shielded from air currents at a fixed distance above the iron stream in the spout. The results obtained have proved conclusively that the foundry is capable of judging from its use whether the iron is in a satisfactory pouring condition for a given class of work. For this device the two men were awarded the S. Obermayer prize. (THE IRON AGE, Oct. 15, 1925, page 1044).

M. S. Clawson (THE IRON AGE, Nov. 12, 1925, page 1310), describes the making of metal molds by a new "plastic process." This process includes a new electric resistance furnace for melting the metal, and a method by which castings are made to almost exact size and form so that only grinding and finishing are required to produce a complete die for stamping or a mold for forming materials.

F. K. Vial published (THE IRON AGE, Feb. 12, 1925, page 473) results of experiments on the desulphurization of iron, in a foundry making chilled iron car wheels, by the use of soda ash compound in the ladle, and was able to remove readily upwards of 40 per cent of the sulphur on small tests, and about one-third of the sulphur content when working on full size heats of iron in a bull ladle.

Mechanical Puddling Furnaces

F. H. Dechant (THE IRON AGE, Oct. 29, 1925, page 1175) described before the American Iron and Steel Institute, at its fall meeting in October, the Ely furnace of square section, mounted on carrier rings, permitting its oscillation at will for the mechanical puddling of iron. The furnace produces an 800-lb. puddled ball and a special squeezer was designed for handling it.

J. P. Roe (THE IRON AGE, Oct. 29, 1925, page 1175) described the latest form of his mechanical puddler, the form being rectangular, 12 ft. wide and 24 ft. long. The weight of the ball is 1200 lb. and five heats constitute a 12-hr. turn.

James Aston (THE IRON AGE, Oct. 29, 1925, page 1176) described his process for making iron synthetically by producing his metal in a Bessemer, open-hearth or electric furnace, and then pouring the molten refined metal into a bath of molten slag held at about 2100 deg. Fahr.

Electrolytic Iron

The Niagara Electrolytic Iron Co., Niagara Falls, N. Y., began production of electrolytic iron tubes last year. This process, described in THE IRON AGE, Sept. 10, 1925, uses an anode of cast iron, cast directly at the blast furnace, and a cathode in the form of a grease-coated steel mandrel which revolves rapidly while deposition is taking place. The electrolyte is ferrous chloride which is pumped-continuously through the deposition cells and through tanks where the liquor is recuperated with iron in the form of steel turnings and chips. The tanks are made of concrete impregnated to a depth of several inches with molten sulphur.

The process is a modification of the French Bouchayet process in use at Grenoble, France, and the plant at present is equipped with a total of 140 cells which, with the additions contemplated for the immediate future, will bring the plant to a capacity of about 7 tons of fresh material per day. Special apparatus has been installed for annealing the tubes, stripping them from the mandrel and slitting them into strips when desired. Material will be available for oil cans, cartridges, door knobs, grease cups, vacuum bottles, disks, bottles for ammonia and other gases, high grade hinges, metallic hose, toys, ferrules, electric ingot iron and for general deep drawing for a wide variety of purposes.

The Open-Hearth Furnace

Four new 125-ton stationary open-hearth furnaces recently put in operation at the Fairfield Works of the Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., have a unique arrangement of regenerator chambers, which are built on converging angles giving direct connection with the chimney. Waste heat boilers of the marine fire tube type are provided. The furnaces burn either tar, by-product gas or oil.

A very important development has been promulgated by the American Institute of Mining and Metallurgical Engineers which has formed a special subcommittee on open-hearth steel practice. Two meetings were held during the year, the second at Cleveland in October, at which more than 30 steel companies were represented, together with a number of consulting engineers, members of the Bureau of Mines and representatives of two of the large makers of refractories. Considerable progress is being made and full, free and frank discussions took place which augur well for the future. Various sub-committees were appointed, as for instance, on furnace design, practice and yield, and refractories respectively, to bring about an exchange of information which will result in great benefit to the industry. E. A. Whitworth is chairman of the committee, which is a sub-committee of the Iron and Steel Committee of the A. I. M. and M. E., L. B. Lindemuth is secretary and the committee had been given its real impetus by J. V. W. Reynders, president of the institute.

C. H. Herty, Jr., read a paper before the American Institute of Mining and Metallurgical Engineers in February on "Some Factors Affecting the Elimination of Sulphur from the Basic Open-Hearth Process," pointing out among other things that a direct ratio exists between the concentration of sulphur dioxide over the bath and the amount of sulphur picked up by the scrap during melting, and that a direct ratio also exists between the concentration of sulphur dioxide over the bath and the concentration of the sulphur in a slag containing lime when sufficient time has been allowed for equilibrium to be established.

A machine for repairing open-hearth furnace slag lines is described in THE IRON AGE, Dec. 17, 1925. By means of this machine, which is marketed by the Blaw-Knox Co., dolomite is fed from an overhead hopper large enough to hold material for two furnaces. From the hopper the dolomite falls through a cone-shaped

chute into the groove of an 18-in. pulley which revolves and throws out the dolomite by centrifugal force. It is said that the time required for making the back wall is seldom more than four or five minutes. It is quite possible that a development of this machine may tend toward the design of wider hearths and better proportions of width to length than exist at present in the open-hearth.

J. H. Hruska (THE IRON AGE, Nov. 12, 1925, page 1305) gives in the form of a graphic curve the results of many observations on the proper time of pouring large ingots.

Soaking Pits

T. F. Baily described in THE IRON AGE, Feb. 26, 1925, page 617, the experience of the Donner Steel Co. with electrically heated soaking pits, demonstrating that the use of these pits gives a better quality of heating, due to accurate control of temperature, uniformity of heating, and elimination of scale while in the pit, elimination of cutting of the ingot as in the case of sharp gas flames, and the production of better surface on the blooms. He maintains that the cost of heating is actually less than by any other means, provided the ingots can be charged into the pit at such temperatures as are now common in steel mill practice. He also claims a saving of space, making it possible to install twice as many pits in a given area, together with economy in construction of foundations.

The Rolling Mill

An improved process for making seamless steel tubes was recently installed at the steel works of Messrs. Howell & Co., Ltd., Sheffield, England. The process, known as the Wellman-Peters process, was designed by the Wellman-Smith-Owen Engineering Corporation, Ltd., London, the British associate of the Wellman-Seaver-Morgan Co., Cleveland. The new process is also known as the push-bench process and consists in pressing a heated square billet into a hollow thimble-shaped billet, which is inserted on a mandrel and pushed through a series of reducing dies. Later the tube and mandrel are passed through a reeling or polishing machine, removing the mandrel, and then through sizing rolls and on to the automatic cooling bench (*Iron Trade Review*, Oct. 29, 1925, page 1079).

J. D. Knox (*Iron Trade Review*, Feb. 19, 1925, page 503) describes a new automatic doubler and a tin-pot feeder, intended to do away with much of the heavy labor in the tin plate mill, and which bid fair to revolutionize the industry by the rearrangement of certain steps in the rolling process.

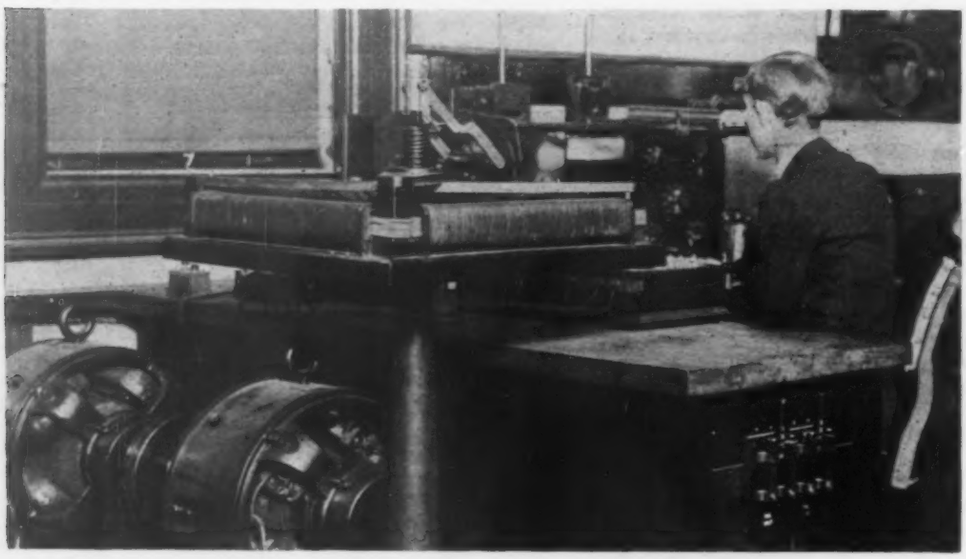
In THE IRON AGE of Nov. 19, 1925, page 1375, is described a scraping device whereby billets and bars can be cleaned during the process of rolling without reducing the tonnage produced. Vertical and horizontal acting knives scrape off surface imperfections, such as heavy scale, scabs and slivers from the billet during the process.

Stainless Steel

The Hamilton-Evans direct process for production of stainless iron was described by H. S. Primrose in a paper before a meeting of the Manchester (England) Association of Engineers, and an abstract of this article will be found on page 479 of THE IRON AGE, Feb. 12, 1925.

Properties of Metals at High Temperature

T. D. Lynch, N. L. Mochel and P. J. McVetty (June meeting, A. S. T. M.) have written a paper entitled, "Tensile Properties of Metals at High Temperature, Showing Effect of Stress and Time," pointing out that the proportional limit of the customary short time tensile test has a definite physical meaning at low temperature for medium carbon steel, and that continuous creep at or below this stress is not to be expected.



A Physicist of the United States Bureau of Standards Testing the Magnetic Properties of a Sample of Electrical Sheet Metal. Over $10,000,000 *worth of sheet steel is purchased annually in the United States on the basis of specifications as to its magnetic properties*

T. M. Jasper discussed the endurance limits at various temperatures of some wrought ferrous metals and their relation to tensile strength, in a paper entitled "Typical Static and Fatigue Tests on Steel at Elevated Temperatures." (June meeting, A. S. T. M.) Special attention was drawn to the fact that, at temperatures of from 400 to 600 deg. Fahr. the tensile strengths are materially lower when tests are made with very slow increase in load above the proportional limits than when carried out at ordinary laboratory speeds of testing. Work on the strength of metals at high temperatures is of increasing importance, seeing that higher steam temperatures are demanded in power plants and certain industrial process work.

New and Improved Testing Instruments

The Warner & Swasey Co., Cleveland, has put on the market a 4-wheel, vertical spindle, metallographic grinding and polishing machine which bids fair to become the standard type of vertical spindle machine. It is typical of Warner & Swasey products in the matter of excellent design and construction, and runs without vibration or jumping. The disks can be run individually or all together.

The measurement of the lateral rebound of a 10-mm. ball falling vertically on the previously prepared surface of a test specimen forms the principle of the

Sauveur "Durometer" for testing the hardness of steel and other metals. The specimen is set at an angle of 45 degrees.[1]

A new series of recording and indicating pyrometer instruments with noble and base metal thermocouples has been placed on the market by the Republic Flow Meters Co. The instruments are simple and rugged in construction; interchangeability of parts, combined with a high degree of accuracy, are notable features. The Brown Instrument Co. and Charles Englehard have also improved their pyrometer recorders.

The Bausch & Lomb Optical Co. has placed on the market a new wide field binocular microscope with paired eye pieces and objectives for the examination of macrostructure and metal fractures at magnifications ranging from 7 to 30 diameters. It is also useful for the study of foundry sands, refractories and ores. E. Leitz has placed a somewhat similar instrument on the market.

Furnaces for Heat Treatment of Steel

One of the interesting developments during the year has been that of electrically heated furnaces for the heat treatment of steel on a large scale, and the designers of gas-burning furnaces have also sought to increase the efficiency of these furnaces by means of automatic controls and recuperators.

A new electrically heated furnace for tempering hardened steel parts, described by J. W. Harsch (*Trans.* A. S. S. T., September, 1925, page 340), includes a novel fan system for circulating the warm air in the furnace for promoting uniform temperature conditions.

C. L. Ipsen (*Trans.* A. S. S. T., July, 1925, page 36) has shown that the cost of the heat treatment of steel depends on many factors besides the installation cost of the furnace and the cost of fuel, the latter being often lower than that of other single factors. He demonstrated that a statement of the efficiency of a heat-treating furnace must be based on the operating cycle, and showed that the efficiency of an electrically heated furnace may vary from 33 to 78 per cent, depending on the cycle and the material to be heated.

S. P. Rockwell[1] has designed and placed on the market a new apparatus for determining when steel has passed through the critical range on heating by measuring its dilatation, and O. E. Harder, R. L. Dowdell and A. C. Forsyth[1] have described a similar method.

Progress in Heat Treatment Research

It has been pointed out by C. J. Stark (*Trans.* A. S. S. T., December, 1925, page 721) that over 3,000,000 tons of steel are now being scientifically heat treated every year. The field of greatest progress has been in the automobile industry. The railroads have been slow in the use of such material, but are beginning to evince a greater interest in heat-treated steels for material for locomotives and cars.

The seventh annual convention and steel exposition of the American Society for Steel Treating was held in Cleveland, Sept. 14 to 18. There was a total of over 40,000 persons at the exhibition, which occupied more than 40,000 sq. ft. of floor space in the Cleveland Public Auditorium. The exhibits numbered 180 and many were turned away for lack of space. The value of the exhibits was estimated at $2,000,000. Many of the exhibitors expressed the opinion that it was the most successful exposition of its kind ever held. Over 5000 members, exhibitors and guests were registered, and some 58 per cent of the membership of the society attended, which was a record in itself. The attendance at the technical sessions was usually not less than 250 persons, while at one session there were over 500. The technical papers were of unusually high grade and were practically all pre-printed, for the first time in the history of the society. The society is doing a unique and important work and this convention marks an important step in its history.

A joint committee for the preparation of standard definitions of terms relating to heat treating has been organized by the American Society for Testing Materials, the American Society for Steel Treating and the Society of Automotive Engineers. This committee of nine members, three from each society, has already had one meeting and decided on definitions for some of the common terms and is now considering "heat treatment," "annealing," "hardening," etc.

Quenching Carbon Steels

By means of a special quenching device which he designed for use in the commercial production of bolts and rivets, Major R. H. Smith (*Trans.* A. S. S. T., May, 1925, page 569) was able to obtain tensile strengths as high as 160,000 lb. per sq. in. on low-carbon steels (0.09 to 0.15 per cent C.) without reducing the ductility dangerously.

H. J. French[1] and O. Z. Klopsch describe results of experiments to show the effects of initial temperature and mass in quenching high-carbon steels.

Work has been in progress at the United States Bureau of Standards to determine the predominating factor in aqueous quenching solutions in order that predictions as to the necessary solutions and concentrations can be made for any desired cooling velocity. Motion pictures have been taken of samples during the actual quenching and special apparatus is now being designed and built for pressure quenching for obtaining increased cooling rates for a given solution and for making emulsions of oil and water without the use of air in order to obtain cooling rates intermediate between those obtained by water and oil.

C. Benedicks, K. G. Lundt and W. H. Dearden (*Trans.* A. S. S. T., April, 1925, page 445) describe the fundamental factors for obtaining sharp thermal curves and recommend a pear-shaped specimen for thermal critical point determinations.

S. N. Petrenko (*Trans.* A. S. S. T., November, 1925, page 519) compares slow bend and impact notched bar tests on steel and other metals in order to determine whether the slow bend test might be used as a substitute for, or as an addition to, the impact test. He found that the impact test in ordinary routine practice was more convenient than the slow bend test. He derived an empirical formula in which the slow bend and the impact value is shown as a sum of two terms, one of which is proportional to the radius of the notch and the other to the square of the net thickness of the specimen. He found that, for tough materials, the impact and slow bend values are little affected by the radius of the notch but greatly affected by the net thickness of the specimen; while the reverse is true for brittle materials.

C. B. Sawyer (*Trans.* A. S. S. T., September, 1925, page 291) has reviewed a large number of articles dealing with nitrogen in steel and he gives conclusions from his own work on the subject.

H. J. French and T. G. Digges (*Trans.* A. S. S. T., December, 1925, page 681) obtain, from experiments with nickel, tantalum, cobalt and molybdenum in high-speed steels, suggestions that the advantages gained by the addition of nickel and cobalt in these steels are associated with the heat treatment rather than the composition.

M. A. Grossman[1] and E. C. Bain have studied low tungsten tool steels containing somewhat over 1 per cent carbon and 3 per cent tungsten, obtaining data on the hardness, toughness, shrinkage and microscopic structure of two types of these steels, namely oil and water-hardening types.

W. E. Ruder (*Trans.* A. S. S. T., July, 1925, page 23) has shown that the magnetic permeability of silicon steel crystals, having their cube edges perpendicular and parallel to the direction of the applied flux, is from 10 to 25 times as great as those crystals which have their cube edges at an angle.

Study of Magnet Steels

Dr. J. A. Mathews, as the 1925 Henry Marion Howe lecturer of the A. I. M. and M. E., and also in the *Transactions* of the American Society for Steel Treating, November, 1925, page 565, has pointed out that

[1] Described in a paper read before the Cleveland convention of the American Society for Steel Treating, September, 1925.

according to his long experience, for all normal hardening mediums in high-carbon steels and in the usual engineering alloy steels, austenite is always present with martensite; that in a wide variety of alloy steels, notably those capable of hardening readily in oil, there is more austenite retained after oil quenching than after the usual water quenching. He states, also, his belief that austenite is a cause of increased magnetic permanence or retentivity in those alloys capable of hardening readily in oil.

The coercive force and residual induction of magnet steels have been studied by J. R. Adams[1] and F. E. Goeckler as applied to commercial problems, especially with regard to the factors which have the greatest influence on these values, namely, composition, melting, casting, rolling or forging and heat treatment.

R. P. DeVries (*Trans.* A. S. S. T., August, 1925, page 139) has studied several types of magnet steels for use in radio equipment and has pointed out that neither residual induction nor coercive force should be at a maximum but that a high average should be obtained for both.

Case Hardening Problems

Hugh Rodman (*Trans.* A. S. S. T., May, 1925, page 635) has studied the effect of alkalis in carburizing compounds, and has demonstrated that the energizing effect of carbonate additions varies according to the position of the alkali or alkali earth in the periodic system. He found that the energizing effect increases with the increasing atomic weight of the alkali earth, and decreases with increasing atomic weight of the alkali.

B. F. Shepherd (*Trans.* A. S. S. T., June, 1925, page 774) has prepared a recommended practice for the carburizing and heat treatment of carburized objects which, with minor changes, was adopted as a tentative recommended practice by the American Society for Testing Materials.

Dendritic Segregation

Dr. Albert Sauveur and Dr. V. N. Krivobok prepared for the September, 1925, meeting of the Iron and Steel Institute a brief but important paper on dendritic segregation on iron-carbon alloys, arriving at the conclusions that the presence of oxygen alone in pure iron is not sufficient to produce persistent dendritic segregation; that phosphorus, in the substantial absence of any other element, may cause persistent dendritic segregation; that carbon, in the substantial absence of any other element, may cause persistent dendritic segregation, provided solidification has been sufficiently rapid to prevent its complete diffusion, showing that alpha ferrite is capable of retaining some carbon in solution, and that the ferrite in the fillings contains more carbon than the ferrite in the axes; that the presence of both carbon and phosphorus results in a more intense and persistent dendritic segregation; that the presence of 0.39 per cent phosphorus in an alloy containing 0.17 per cent carbon causes the carbon to be completely driven from the fillings into the axes, resulting in dendrites consisting of pearlite axes and of ferrite fillings; that the presence of oxygen in alloys containing phosphorus or carbon, or both, does not appear to intensify dendritic segregation; and that alpha ferrite is capable, after slow cooling, of retaining in solution at least 0.06 per cent of carbon.

Dr. V. N. Krivobok (*Trans.* A. S. S. T., April, 1925, page 457) has studied secondary crystallization in iron-carbon alloys, and has pointed out the extreme importance of the structure of cast steel objects which are to be heat treated, and has traced the genesis of the formation of two extreme types of structure back to the zone of their origin and formation.

Influence of Cold Work

Dr. F. C. Langenberg (*Trans.* A. S. S. T., October, 1925, page 447) has studied the effect of cold work on the strength of large hollow cylinders, and has described a process of manufacture by which the physical properties of large size, simple hollow cylinders, such as gun tubes, may be greatly increased over the usual properties obtained. He describes the manufacture of gun tubes by the cold working process and the effect of the annealing operation on the elastic strength of cold-worked, simple and compound cylinders after the application of various amounts of cold work.

Dr. V. N. Krivobok (*Trans.* A. S. S. T., December, 1925, page 703) has studied thermal disturbances and recrystallization in cold-worked steel, and has found a new critical point similar to the usual critical points but opposite in sign, which he designates by the term "Ax." He believes this point to indicate both recrystallization and a relief of internal strains, and that its appearance must be closely connected with the specific properties imparted to a metal by cold working.

Metallographic Problems

C. O. Burgess and J. R. Vitella (*Trans.* A. S. S. T., April, 1925, page 486) gives a special method of preparation for eliminating the possibility of error arising in the examination of poorly prepared samples.

Dr. W. M. Mitchell (*Trans.* A. S. S. T., May, 1925, page 618) discusses the relation of resolving power, magnification and enlargement in photomicrography. He has calculated the maximum theoretical resolving power of the microscope and emphasizes that it is not always a question of *what can be seen*, but of *how easily one can see it*, and calls attention to the fact that a proper enlargement beyond that producing maximum resolution of detail is permissible and helpful.

F. F. Lucas has continued his experimental work on photomicrography at unusually high magnifications and has developed a special microscope using ultra violet light for this work.

R. J. Guthrie has described his special methods of preparing samples of metal for photomicrography at high magnifications, and has published (*Trans.* A. S. S. T., January, 1925, page 4, and May, 1925, page 337) examples of his work at high magnifications.

X-Ray Spectrometry

K. Heindlhofer and F. L. Wright (*Trans.* A. S. S. T., January, 1925, page 34) have applied the X-ray diffraction method to reveal the nature of a transformation occurring while tempering quenched ball steel, and has shown that austenite is invariably present in the specimen; that this austenite transforms at temperatures between 200 and 260 deg. C., and that during this transformation the formation of an intermediate hard product (martensite) is indicated. They also show that this intermediate product was subjected simultaneously to tempering on account of the prevailing temperature.

E. L. Reed, in his Carnegie Scholarship Memoir, 1925, Iron and Steel Institute, reported the results of an "Investigation of the Properties of Iron-Carbon Alloys (A) Melted in Vacuum, (B) Melted in Air" and among other conclusions has arrived at the following: The vacuum-melted alloys were, as a rule, much sounder and freer from inclusions than the corresponding air-melted ingots; neither carbon alone nor oxygen alone, or jointly, causes permanent dendritic segregation; added elements, especially phosphorus and nickel, resulted in dendritic segregation; the air-melted alloys, after heating in air followed by quenching, contain more martensite than the vacuum-melted samples after heating in vacuum followed by quenching; cases quite free from nitride needles were obtained in case-hardening in air vacuum-melted alloys, while the cases of similar alloys melted in air contained numerous nitride needles, besides being less thick; in case-hardening in vacuum with the compound described there was little absorption of carbon, with the exception of the vacuum-melted alloy containing 0.135 per cent phosphorus, and to a less degree with the vacuum-melted alloy containing 0.610 per cent copper, both of which were more deeply carburized; the Ar_1 point generally occurs at a

lower temperature in the air-melted alloys than in the vacuum-melted samples; the brittleness of electrolytically deposited iron is removed without any apparent change of structure by heating to 343 deg. C., while recrystallization was observed after heating to 675 deg. C.

Non-Ferrous Metals in 1925

Importance of Research—Technical and Economic Features—Rapid Strides in Aluminum and Its Alloys—Nickel Developments a Feature

BY W. M. CORSE

THE non-ferrous metal industry naturally reflected the good business conditions that existed in 1925. Favorable reports come from all quarters. As development and research activities usually precede sales, especially where a widening market is desired, it will be perhaps of more interest to outline the items of importance in the technical end of the industry and leave the economic aspects to follow in their natural sequence.

Copper and Brass

Copper and brass are usually associated together in the minds of many users. As the brass industry is a large consumer of copper, it is entirely natural that conditions surrounding copper have a direct influence on the brass business of the country. Remarks, therefore, that apply to one are usually applicable to the other and, for the purposes of this article, they are considered together.

The price of copper was low and fairly stable during 1925. The industry made steady progress during the year and was nearer to stabilization than at any time since the war, because production had been brought closer to consumption and was being controlled in a businesslike and common sense way.

The outlook for 1926 is splendid, because there is every indication that export business will materially increase. In the manufacturing end the greatest change has come in the melting of brass. The larger rolling mills have changed over to the use of electric furnaces, mainly the Ajax-Wyatt and Detroit, and now the Northrup furnace is coming into use. The Detroit electric furnace is also being used by a great many of the brass manufacturers, both rolling mills and foundries, for melting the higher melting point metals. The Northrup is still in the development stage, but promises well and will be used considerably in the foundries and for special metals, particularly those with melting points as high as copper and higher.

In the Automobile and Railroad Fields

Better and more scientific methods are gradually finding a place in the foundry and the casting shop. The pyrometer has become a standard piece of equipment in many foundries and the importance of proper pouring temperatures is being realized. The automobile, by its rigid specifications, has been the means of stimulating the brass foundry scientifically, and has brought into being most of the aluminum foundries.

In the railroad field the progress has been slower, but there are indications of a scientific awakening here also. The method of the "jolly good fellow," with all his accomplishments, is going to disappear here as it has in other fields, after the salesman has been furnished with accurate scientific facts from which sound sales arguments can be framed.

Metal for Bearings

One of the largest of the railroad bearing metal manufacturers, the Chicago Bearing Metal Co., has, within the year, started on a research program in conjunction with several research organizations, among which is the Bureau of Standards, to determine some of the fundamental properties of bearing bronzes. This subject is a large one and of great economic importance to the railroads and the country as a whole. Although only a start has been made, the results already obtained would seem to justify a rather extended program. I mention this case particularly because fundamental research, as distinguished from research on manufacturing or works problems, in the brass foundry business has not had the support in this country that it has in Great Britain, where the British Non-

WILLIAM M. CORSE, consulting metallurgist of Newell, Corse & McDaniel, and vice-president and general manager of the Research Service, Inc., Washington, was graduated from the Massachusetts Institute of Technology, Cambridge, Mass., in 1899. *After serving as a chemist for a number of chemical and metal-working industries, he became, in* 1907, *assistant general manager of the Michigan Smelting & Refining Co., Detroit. From* 1908 *to* 1922 *he served in an executive capacity with the Empire Smelting Co., Depew, N. Y.; with Titanium Bronze Co., Niagara Falls, N. Y.; with the Ohio Brass Co., Mansfield, Ohio, and the Monel Metal Products Co., Bayonne, N. J. He was connected with the National Research Council, Washington, from* 1922 *to* 1924, *when he entered on his present activities. He has been constantly engaged in consulting work for various large companies in the non-ferrous field and has been identified with the scientific end of the brass foundry industry from the beginning. He developed the manufacture of aluminum bronze commercially during* 1914 *to* 1918. *During the war he did special duty at the Portsmouth, N. H., navy yard in brass foundry practice. For* 15 *years he was secretary of the American Institute of Metals, now the Institute of Metals Division of the A. I. M. and M. E. He served as president of this organization and has been a director of the A. I. M. and M. E. He is a member of leading American and foreign technical organizations. He has published several contributions to technical periodicals.*

Ferrous Research Association, under the able direction of Dr. R. S. Hutton, has been doing excellent fundamental research for several years.

The Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers appointed in 1925 a research committee under the chairmanship of Dr. P. D. Merica, director of research International Nickel Co. It is to be hoped that the activities of this committee, which will be confined to fundamental research on non-ferrous subjects, will result in a much wider interest in the subject among metallurgists and manufacturers. The brass rolling mill industry, because of the more severe requirements put on the metal in the process of manufacture, has advanced somewhat more rapidly than the foundries, but the difference in years between the two can be counted on the fingers of one's hand.

Permanent Molds

The rolling mill man has practically always used chilled molds for his castings, but 1925 has seen more advances in chill or permanent moldings in the foundry than ever before. Such companies as the Holley Carbureter Co.; the General Motors Corporation, research division, and the Aluminum Co. of America have spent several hundred thousand dollars on development work on this subject.

Much of the work has been done on cast iron to date, but the fundamental principles involved are the same for brass and bronze. Aluminum, because of the lower melting point, presents a different problem, but many of the factors are the same. Permanent mold processes show an average speed of at least four to one over sand molding, which, combined with a relatively low mold cost, results in a lower cost and a product of better quality. At present permanent molds are better adapted for production or repetition castings than for jobbing work.

Bronzes

Such alloys as phosphor bronze and manganese bronze have maintained the even tenor of their ways, without many changes in either uses or composition. Manganese bronze is made with somewhat more refinement since the war, and special properties for certain grades are obtained by careful manufacturers with slight modifications of formula and foundry practice. In the main, however, their position in the industry is fairly well fixed.

Other bronzes, some of which are relatively new, made rapid advances during 1925.

Aluminum Bronzes

Aluminum bronze, first made in large quantities in this country by the American Brass Co. as rolled products about 1910, and by the Titanium Brass Co. as castings in 1915, has, because of its many valuable properties, received a steadily increasing share of attention. The possibilities of this series of copper-aluminum alloys, known as aluminum bronzes, are large and their development is just beginning.

Previous to 1925, the uses of aluminum bronze were largely confined to wear-resisting parts, such as worm gears, and to uses where fatigue was an important factor. During 1925, however, some modifications of the alloy, principally with the addition of iron, were made, and these alloys were found to possess good resistance to acid corrosion in addition to the other well-known properties of resistance to wear and fatigue. One such alloy, known as Alcumite, a name derived from its chemical composition, is being manufactured for the chemical trade, and finding increasing uses as its properties are becoming better known.

Another special bronze, put on the market in 1925, is Everdur. It is a high copper-silicon-manganese alloy with properties of resistance to certain acids and other chemicals. Because the scientific work on this type of alloy has not been so extensive as on the aluminum bronzes, for example, its uses are not so well defined as they will be later.

In all cases of special alloys, the main problem is to find the best use for the product, so that sales cost may not be dissipated in directions where permanent use will not be established. Much money has been wasted in the past in attempting to introduce a new metal or alloy into an industry for which it was not adapted. The enthusiasm of the salesman frequently outruns his supply of scientific data. The best business is built on a firm foundation of scientifically determined facts supplemented by service data, a process in which time plays an important part.

Lead

Lead as a metal is used by itself and as a constituent of white metal alloys, such as babbitt and solder, and as a component of many brasses and bronzes. The price during 1925 has been high and, when the weight per cubic inch is considered, approximates that of brass. Lead cannot now be considered as a cheapener of alloys, and consequently is used only when its special properties are desired.

In the recovery of lead from complex lead-zinc ores, there has been a continuation of the development of hydrometallurgical processes. Methods of refining lead and also of secondary lead products are being developed as based on the Harris patents, originally taken out in England and extended under United States reissue Nos. 15750 and 15751. This process was mentioned in "The Mineral Industry During 1924," and has been further developed during 1925.

Zinc

"The outstanding feature of the world's zinc industry in 1925 has been the scarcity of ore," says W. R. Ingalls in the *Bulletin* of the American Zinc Institute for December. This naturally results in a high price for the metal which, as the year closes, is about 9c. per lb., New York.

The largest use for zinc in the United States is in galvanizing iron and steel. Next in importance is brass making. These two uses account for about 80 per cent of the consumption. Then comes sheet zinc, taking about 11 per cent. The remainder is distributed among zinc white, lithophone, atomized zinc dust, die castings, slush castings and for the desilverization of lead.

It is helpful to analyze these uses. About half the zinc employed for galvanizing is for coating sheets. Next comes tubes, then wire and cloth; then the coating of shaped articles such as pole-line hardware, general hardware, hollow ware and chains. The sheet zinc is used for roofing, flashings, floor coverings, wash boards, fruit-jar covers, batteries and a myriad of other things.

In many of these uses zinc is not indispensable, so that economic factors play a larger part in the use of this metal than with copper and lead. With lead, for some uses it must be had at any price. Not so with zinc, so that a high price may not be an unmixed blessing. The per capita use of zinc in recent years has been about 9 lb. of metal, and about one pound in the form of oxide and lithophone made directly from ore.

The electrolytic production of zinc is increasing and the product compares favorably with the distilled metal of the highest grades. The labor difficulties are less with the electrolytic zinc and are under better technical control, so that the distillers have added competition from this quarter.

While some ore reserves are being exhausted, others are opening up, a process which naturally lags behind, thus temporarily affecting the price rather sharply. The best authorities, however, are not pessimistic over the outlook and believe that the supply will be able to take care of the normal demand.

Aluminum

The aluminum industry was very healthy in 1925. Most of the metal produced in the United States was consumed here and a considerable tonnage was imported in addition. The Aluminum Co. of America is practically the only producer of aluminum in this country, therefore it is of interest that its capital stock was greatly increased in 1925. This company is apparently anticipating an increased demand for this metal because it has acquired large water rights for power

in the Saguenay River, Quebec, and is now constructing plants there for the production of this metal. Aluminum continues to be used in increasing amounts for high-tension electric transmission lines.

One of the outstanding developments of the year was the rapid growth of the aluminum paint industry. Research has again demonstrated that it can be translated into sales by developing improved aluminum powder and better vehicles with which to mix it. Better knowledge of how to apply the paint in order to get satisfactory results has been a help.

Strong Aluminum Alloy

The strong wrought alloys of aluminum are finding their places in industry in rapidly increasing tonnages. The same is true of heat-treated strong aluminum alloy castings. These castings practically amount to a new material for construction because of the simultaneous increase in both strength and elongation. Aluminum automobile engine pistons, replacing cast iron, are reported to have been made in 1925 in larger quantities than ever before.

The aluminum-silicon alloys, which were developed a few years ago, are continuing to be used in large quantities for die castings, and to a certain extent in sand castings, both in the normal and modified condition.

Of particular interest is the fact that the new model automobile buses are using aluminum in their construction to an extent not heretofore employed except, perhaps, in Europe. The reduction in weight of aluminum and its alloys has always been a tremendous incentive to its use in many types of machinery. The airplane use is obvious, but automobile truck builders are following the lead and using increasing amounts of this light, strong metal, whose properties are continually being improved by careful, scientific research.

As mentioned before in this article, the railroads are behind the automobile in taking advantage of the latest developments in non-ferrous metals. In 1925, however, the railroads began to take advantage of the reduction in weight, made possible by the use of aluminum, and may be expected to be large users in the future.

The United States Navy, due to the regulations of the naval disarmament program, are using increasing amounts of light metals in construction in order to get more machinery on board ship with the same displacement. Aluminum and its lighter cousin magnesium will, therefore, play an increasing rôle in the first line of our country's defense.

Recent Researches

Because of the youth of the metal aluminum, the opportunities for the increase of knowledge concerning it are tremendous. It may be of interest, therefore, to mention the outstanding researches that have been published during 1925:

Dr. F. C. Frary, director of research of the Alumunum Co. of America, announced before the American Electrochemical Society in April the production of a very pure metal made by a new process which in certain instances contains 99.97 per cent aluminum.

Archer and Jefferies, of the same company, described some new developments in strong wrought and heat-treated aluminum alloys before the American Institute of Mining and Metallurgical Engineers in February. Faragher, of the Aluminum Co. of America, described the properties of many wrought and cast aluminum alloys in *Mechanical Engineering* in May.

E. H. Dix, of the same company, described the results of a metallographic examination of the pure aluminum-iron alloys before the American Society for Testing Materials in June.

R. J. Anderson published a comprehensive treaties on the "Metallurgy of Aluminum and Aluminum Alloys" during the year.

Nickel

Nickel is a metal that apparently received a body blow when the naval disarmament treaty was signed a few years ago. At that time 60 per cent of the world's supply was being used in steel for armor plate and gun forgings, the demand for which immediately stopped. The story of how this market has been replaced by other uses is largely the history of the development and research department of the International Nickel Co., the largest producer of nickel in this country and Canada.

It is interesting to note that the quantity of nickel produced in 1925 exceeded that of 1913. The credit for this achievement is given to the activities of the development and research department together with the sales department, by the president of the International Nickel Co. in his report of April, 1925. This is probably the first time that a large corporation, interested in the manufacture of non-ferrous metals, has publicly acknowledged its debt to industrial research and, therefore, it is of more than passing interest.

New Uses for Nickel

The national result of this research activity has been to find a large number of new uses for nickel and its alloys. A book full of interest, and even of romance, could be written about this recent development in nickel, but space will not permit. The definite results of this research work on sales have demonstrated the fundamental importance of engineering knowledge in handling the market.

In order to obtain this knowledge, surveys of promising fields have been made. These include chemicals, dyeing and bleaching, hotel and restaurant, laundry, petroleum, pickling, dairy products, food canning and packing, power, hospital, refrigerating, soda fountain and paper. In order to provide the necessary data for intelligent use in various manufacturing processes, general instructions on forging, annealing, polishing, spinning, cleaning, riveting, lock leaning, soldering and brazing, machining, drawing and welding have been issued. Armed with this sort of data, is it any wonder that the salesman has found it possible to take up the slack and to fill the gap made by the loss of more than half of his market?

The technical advances in nickel and its alloys include such things as the development of the art of nickel plating and the application of heavy nickel deposits. The ordinary nickel plate is about three ten-thousandths of an inch in thickness. Plating a quarter of an inch of nickel in a smooth adherent deposit is now an accomplished fact. Solid nickel endless belts are now possible and nickel coatings of an appreciable thickness offer many interesting possibilities. Nickel is replacing tin as a coating for some uses, and nickel-plated sheet bars give a raw material for a duplex sheet.

New Nickel Alloys

The brass rolling mills, which manufacture the majority of the nickel-silver alloys in this country, have developed several new alloys during the year. Among these are "Adnickel" made by the Scovill Mfg. Co. and "Ambrac" made by the American Brass Co.

The brass foundries have developed the use of nickel in brass, particularly for work subjected to hydraulic pressure. The nickel acts principally as a densifier and also adds other desirable qualities such as resistance to corrosion and toughness. In this class of castings, the nickel is usually kept under 1 per cent and introduced by means of a low melting point alloy containing 33⅓ per cent nickel. For high pressure work the Portsmouth Navy Yard, Portsmouth, N. H., has used as much as 10 per cent in brass mixtures, and the result has been a strong, tight casting with good properties.

Nickel in Brass Founding

At the Syracuse meeting of the American Foundrymen's Association and the Institute of Metals Division of the A. I. M. and M. E., a most interesting and valuable round table discussion was held. Among the topics discussed was the use of nickel in brass founding. Much interest was displayed through an active discussion, which showed, in the majority of instances, decided benefits from nickel used in the manner indicated.

In the bronzes, nickel addition also make for improvement in the alloy. This is true especially with the phosphor bronzes. With the leaded phosphor bronze

for bearings and with the straight phosphor bronzes for worm gears, an addition of nickel up to 5 per cent in some instances has increased the yield point and otherwise improved the metal. In the field of special bronzes, the modified aluminum bronze, Alcumite, has been improved markedly by addition of a small percentage of nickel. Wherever foundrymen and metallurgists have assembled during the year, the subject of nickel additions to brass and bronze is sure to arise, indicating their interest in the matter.

A recent survey indicates that nickel-silver plumbing fixtures are in favor with the architects and builders generally, but that foundry difficulties have held back their development. Plans are on foot for 1926 to remove some of these difficulties, and a report of substantial progress is looked for by the end of the year. Nickel alloys as a class are finding increasing favor as architectural materials and for many general uses.

Since 1922, when the International Nickel Co. opened its new rolling mill in Huntington, W. Va., steady progress has been made in the qualities of its rolled products consisting principally of Monel metal and pure nickel. Formerly sheet nickel was imported mainly from Austria, so that it is only recently that this country has had facilities to produce rolled nickel products.

Magnesium

Metallic magnesium ceased to be a rare metal in 1925, because its production reached a total of 30,000 lb. per month. This represents an increase of 128 per cent over the previous year.

The two largest uses for magnesium are as a deoxidizer or scavenger, and as a base for magnesium alloys. Magnesium combines with both oxygen and nitrogen and, therefore, removes the last traces of air from radio and rectifier tubes. This same property, combined with its affinity for sulphur, makes it valuable as a degasifier for nickel and its alloys, which constitutes one of the large outlets for the metal. Other applications are resonating disks for automobile horns, instrument parts and housing, pulleys, golf club heads, impellers for superchargers, artificial limbs, rear axle housings and camera parts.

Development of the metal has been concentrated on fabricated forms such as castings, plates, sheets, tubing, rods, wire, ribbon and powder rather than on the production of ingot metal, because the future of the metal depends on its wide-spread use. Magnesium has a specific gravity of 1.7, which means that it is about one-fifth the weight of brass.

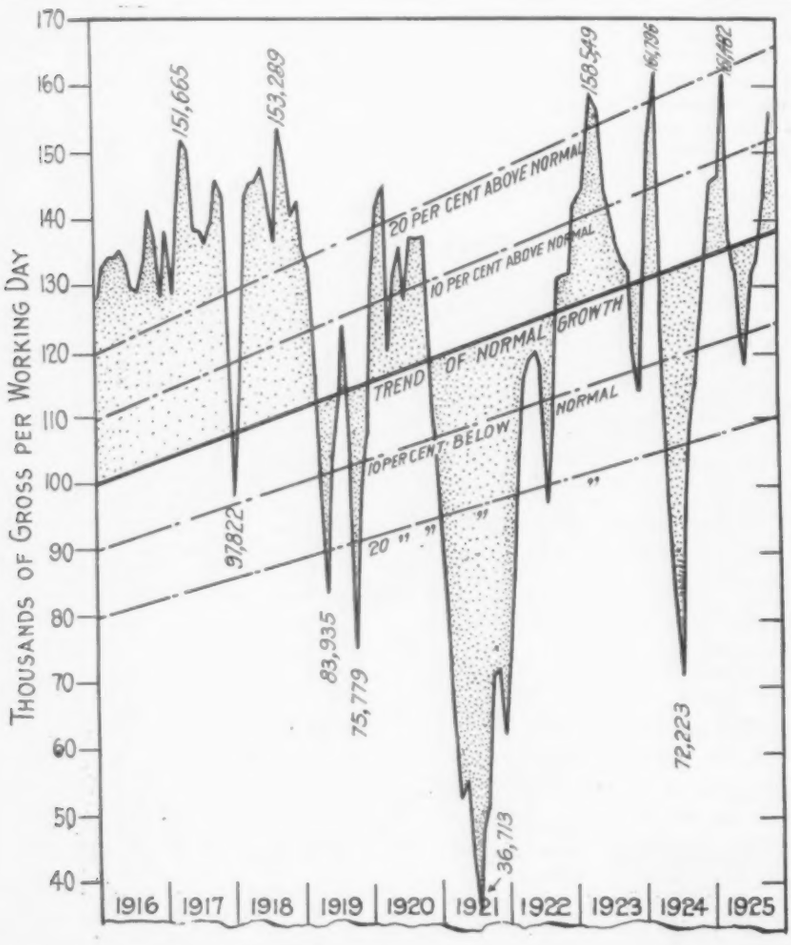
The present price is 75c. per lb. in ton lots, which, for equal volumes, compares with 15c. per lb. for brass. It is hoped that further improvements in production methods will be made in the near future which may result in a price of 50c. per lb. This will make it less expensive per unit volume than brass at normal prices.

Alloys of Magnesium

A number of valuable alloys of magnesium with aluminum are now made and, as their properties are better known, they will become standard for many uses. The use of these alloys, both in structural members and in the form of castings for aircraft, will probably be the field of greatest advance. Magnesium is produced commercially of 99.85 per cent purity, which compares favorably with many other non-ferrous metals.

The ideal composition will combine the lightness of the metal with a definite resistance to corrosion, i. e., a permanent non-tarnishing alloy. An alloy of 95.6 per cent magnesium and 4.4 per cent aluminum approximates these conditions and combines lightness and high mechanical strength with a good degree of permanence.

Another composition, 88 per cent magnesium and 12 per cent copper, is suitable for pistons and bearings because of its wear-resisting properties and its high heat conductivity. The indications for the increase in use of magnesium in 1926 are excellent, but it will probably not increase at as rapid a rate as during 1925.



Rate of Growth in Consumption of Steel

AS consumption in the long run balances production, the growth of the use of steel in the United States has been determined from the statistics of the American Iron and Steel Institute covering steel ingot production for the last 25 years. The monthly fluctuations above and below the gradually increasing needs (the normal) are here shown for the last 10 years. The rate of increase is about 1,204,000 gross tons per annum or 3900 tons per working day, counting 311 such to the year. Present production is apparently in excess of theoretical needs.

Copper Shipments 1,500,000 Tons

New High Levels in Consumption of Major Non-Ferrous Metal in 1925 Reached Partly Through Development Efforts of Its Trade Organization

BY WILLIAM A. WILLIS*

Bronze Figure of the Sixth Century Typifying the Flight of Time

THE American copper industry has just finished a year in which shipments have reached nearly 3,000,000,000 lb. and new high levels in consumption have been established both at home and abroad. The growth of copper consumption to this point has not been a sudden one, but a gradual increase beginning in 1922 and continuing steadily since then. Naturally the recovery of old markets lost during the war, the attainment of new ones, the improvement in quality of products and the wider and better understanding of the value of copper and copper alloys as commercial metals have all played their part in this situation. At the same time we cannot overlook the fact that the rapid development of the electrical industry and abnormal building conditions, coupled with an abundance of cheap copper, have been distinct contributions.

During this period of rapidly increasing consumption the Copper and Brass Research Association has been steadily at work with its educational and research work and these have doubtless been factors of real importance in the result. At least those who have labored in the cause through association channels may point to the fact that the unprecedented growth in consumption has been coincident with the association's existence and leave it to others to decide whether that means anything or not.

Commercial Research of the Association

Advertising and educational propaganda are conspicuous activities of our association and doubtless are regarded by many as our main effort. That is not the case, however. Both the technical and commercial research work of the association operates on a very wide scale and much of the success which the association advertising has achieved has been traceable to this research. When our research, either commercial or technical, develops valuable information we get that information before the public through our advertising as rapidly and effectively as possible.

For instance, our workers have been conducting a series of surveys into actual and potential consuming industries ever since our association was organized in 1921. These are vast in number and require long and exhaustive study, for this sort of research must be absolutely accurate if the results are to be profitably applied. To illustrate what can be accomplished by this kind of work, take the washing machine industry. A few years ago this industry was in its infancy. In the main little or no copper, brass or bronze were used in the manufacture of the machines. A thorough canvass of the industry revealed a general belief among manufacturers that the use of copper would entail a price for the finished machine that the public would not pay. It was up to the association to show the manufacturer that he was mistaken, that the public was always willing to pay a slightly higher initial cost for an article if convinced that it meant an ultimate saving.

We set about this in a systematic way. We quickly established the fact that the life of the average washing machine was relatively brief, which was quite natural considering that almost all of them were manufactured from metals that rust. A rusting metal in a washing machine meant quick deterioration, increasing difficulty of operation and frequently discoloration of clothes. This was brought home to the manufacturers, who in the main were quite in agreement, but they balked when they discovered that a copper machine would cost at least 25 per cent more to manufacture than the ones they were turning out. The public would never stand for it, they insisted, despite the fact that a copper machine would have longer life.

Washing Machines Now Take 15,000,000 Lb. a Year

In time the association's research developed all necessary facts concerning the relative merits and costs of the two types of machines. An advertising campaign along educational lines was then drawn up and notice sent to all manufacturers that an effort would be made to create a demand for the copper machines. Of course, such a campaign could not be launched unless there were copper machines to be had, but in the meantime several of the copper type had been put on the market as an experiment. Our advertising, naturally general in character, brought quick and satisfactory reactions. A demand was speedily established for copper machines and, as to be expected, more and more manufacturers began making them. During the first year the consumption of copper in these machines was about 2,000,000 lb. Last year this had jumped to 15,000,000 lb. and because manufacture has been standardized a copper machine of the modern type can now be turned out for almost the same price as one of the old type. The copper machine is now standard where a few years ago it was difficult to find one at any price.

Copper in Range Boilers Increases 100 Per Cent

We made a similar research into the range boiler industry and since we began in 1922 the consumption of copper in these hot water containers has increased more than 100 per cent. The increase in 1925 over 1924 alone was more than 50 per cent.

One might say that this sort of consumption was negligible in a total consumption for one year of nearly 3,000,000,000 lb. of copper, but it must be remembered that the instances I have cited are but two of many which the association has undertaken and which total a very considerable tonnage. The importance of small consuming industries cannot be overlooked. A 10,000,000 lb. consumer may be a 100,000,000 lb. consumer within a very few years. Commercial research develops these outlets and the field for this research is almost unlimited. Our association has had amazing results in the radio industry, in electric refrigeration, in screen cloth, in sugar, textile and other machinery, and in a dozen other fields. These industries are building up a solid wall of assured consumption for all time behind our main consumers which are the electrical, building and automobile industries.

Technical Research of Varied Character

The association's technical research is of a wide and varied character. We have a general research department manned by experienced engineers, each one of whom is a specialist in some phase of construction work. This department handles thousands of

*Manager Copper and Brass Research Association.

inquiries a year. These range in character from the man who want to know just how he should install brass pipe, copper flashings or copper leaders and gutters in a small home to great corporations which want advice as to where, how and why they should use our metals in office buildings, hotels or apartment houses. Our research department has studied all of these problems fully and through its information and advice has rendered valuable service and made many thousands of friends for copper and copper alloys.

Not an inconsiderable part of the work of this department comes from those who for one reason or another have had unfortunate experiences with our metals and want to know why. In ninety-nine out of a hundred cases the answer is simple—faulty installation. If a man nails copper sheets on a roof he is not going to get much service from them because of the wide range of contraction and expansion. If he hooks up a section of brass pipe with a section of iron pipe he will invite electrolysis which will soon eat out the iron, thus destroying the entire line. It is just as simple to lay a brass water line as one of iron, it is just as simple to lay a copper roof as any other kind of a roof, it is just as simple to put in copper leaders and gutters as those of any other metal. The thing is to do it right and when it has been done right you can forget it for the rest of your life. To make it easy to do these things the way they ought to be done our association has issued books of instruction for plumbers and sheet metal workers and these books have become standard in these trades. Filling a long-felt want as they have, they naturally have been factors in the hugely increased consumption of copper and copper alloys in plumbing and general construction work.

In these fields of smaller technical research may be included hundreds of analyses of metals, studies of water conditions in various parts of the country with a view to determining the best mixtures in brass to meet them, observations of the flow of water through various forms of tubing over given periods of time and a dozen other activities all having in view an improvement in service for consumers of copper and copper alloys through constant improvement in the quality of the metals themselves.

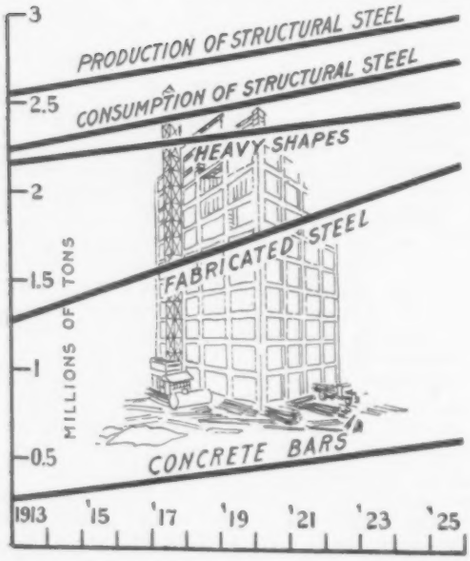
Copper Firebox and Copper Boiler Tubes for Locomotives

In the field of larger technical research results are not so fast. Experimental and test work sometimes consumes years before conclusive results can be reached. For instance, we in the copper industry believe that a locomotive equipped with a copper firebox and copper boiler tubes can be operated more efficiently and more economically than one similarly equipped with steel. Although copper is used for these purposes in Europe, in South America and in the Orient, the American practice is to use steel. When you try to sell a new idea to an American railroad you must have something to show and therefore more than a year ago, working in cooperation with our association, the Northern Pacific Railroad built and put in service under exactly similar operating conditions a copper equipped and a steel equipped locomotive. Each has been subjected to the most exacting tests, but the experiments are not yet completed and until they are little can be said about them. I am not averse to saying, however, that as far as we have gone we of the copper industry are quite satisfied.

A few of the other larger researches which the association has under way include copper as a protection for marine piling, millions of dollars worth of which is destroyed annually by marine worms; research into the fatigue of non-ferrous metals which we are operating in conjunction with the Engineering Foundation and the University of Illinois; exhaustive tests into sheet copper in various service conditions in which we have the aid of the United States Bureau of Standards.

All of the activities which I have mentioned are of course part and parcel of the actual selling force which a collective body like our association is organized to create. Between this work and the merchandising, dealer cooperation and general educational effort there must be complete coordination and this, we believe, we have effected.

Fabricated Steel Trends Sharply Upward



Consumption Since 1912 *Shows These Rates:*

69,000 Tons Increase per Year for Fabricated Steel
40,000 Tons Increase per Year for Structural Shapes (excluding exports)
31,500 Tons Increase per Year for Structural Shapes (including exports)
27,000 Tons Increase per Year for Heavy Shapes
28,000 Tons Increase per Year for Concrete Bars

Annual Needs in Twelve Years Have Increased by These Percentages:

Fabricated Steel	71
Structural Shapes, excluding exports	24
Structural Shapes, including exports	17½
Heavy Shapes	16
Concrete Bars	137

BOOKINGS of fabricated steel work show a remarkably high trend as compared with the plain structural material forming so large a part of it. The statistics are available since 1912 from records of the Bureau of the Census and are presumed not to include tank and other fabricated plate work. The trend lines for the plain material are based on the production data of the American Iron and Steel Institute and all lines have been mathematically located for the 12-year period up to the beginning of 1925. Allowing for more plate girder and other bridge work latterly, the indications are that less structural material is being used outside of the construction industry than formerly. The concrete bar trend is included to show that, while the annual increment seems not so large relatively, the percentage of expansion is high and thus may be displacing large tonnages of straight fabricated steel structures.

New Steel and Iron Capacity

Additions Last Year to Open-Hearth Plant 585,000 Gross Tons and Furnaces Projected for 955,000 Tons—Nine Blast Furnaces Planned, Only One Added—Large Electric Steel Additions

THE feature of the developments in pig iron and steel making in 1925 was the extensive plans made for increases during 1926. Nearly 1,000,000 gross tons will be added to the open-hearth and possibly over 1,750,000 tons to the pig iron capacity.

In open-hearth furnaces completed in 1925, the potential output was only moderate. The year ranks fourth among the post-war years in added facilities and parallels some recent years in actual additions to the number of blast furnaces.

Nine new blast furnaces are projected, over half of which will probably blow in this year. Only one new furnace was put in the active list in 1925. Exceedingly small has been the increase in pig iron capacity since the war—the total for the five years, 1921 to 1925, having been 5 furnaces—one in 1921, two in 1922, none in 1923 and one each in 1924 and 1925. The blank for 1923 repeated a like case in 1896. The war years naturally made the large contributions—25 under way in 1916 and 14 furnaces completed in 1917.

For 1925 the estimated increase in open-hearth capacity was 585,000 tons, with 955,000 tons planned for completion this year. Of the war years, 1917 gave 97 furnaces completed with capacity estimated at 4,326,500 tons, and 1916 gave projects for 72 furnaces with an estimated capacity of 4,515,000 tons per year.

A commendable record was made in electric furnaces; previous post-war records were broken in 1925. New additions are included in this review, as in the last two years.

Additions to Pig Iron, Steel and Rolling Mill Capacity

ACCORDING to reports from blast furnace, steel and rolling mill companies and from some foundries, the following details have been collected as to new construction and equipment completed in 1925 and as to plans under way or in prospect for 1926:

New Open-Hearth Capacity in 1925

Additions to open-hearth capacity last year were moderately large. The total was a little more than the average for the previous six years, 1919 to 1924 inclusive. The 1925 additions include 10 furnaces with an estimated capacity of 585,000 gross tons per year. This compares with 7 furnaces added in 1924, having an estimated output of 375,000 tons. The 1925 record is not far below that of 1919, when a smaller number of furnaces, 9, had an estimated capacity of 625,000 tons annually. The largest increase was in 1923, when the 19 new furnaces augmented capacity about 875,000 tons. The distribution of the new additions last year are shown in the table.

The additions to open-hearth capacity in 1925 were made by the following companies:

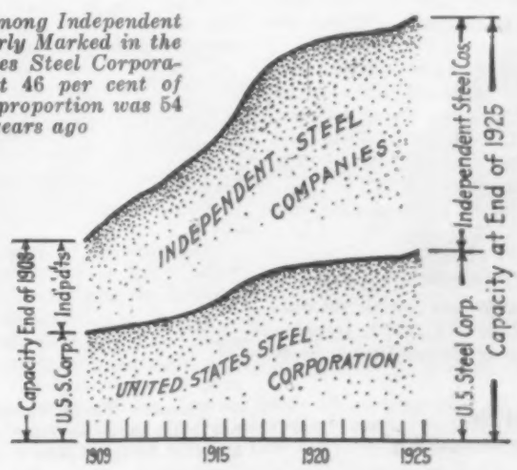
Tennessee Coal, Iron & Railroad Co., Fairfield Works, four 100-ton furnaces; Ford Motor Co., River Rouge Plant, Dearborn, Mich., four 100-ton furnaces; Trumbull Steel Co., Warren, Ohio, one 100-ton furnace and the Commonwealth Steel Co., St. Louis, one 40-ton furnace. The latter is for steel castings.

Open-Hearth Construction in 1926

For probable completion in 1926, 14 open-hearth furnaces are under way or projected. This compares with 9 in 1925, with 7 in 1924, with 17 in 1923, with 6 in 1922, with 15 in 1921 and with 22 in 1920. The largest number ever scheduled for any one year was 91 in 1916—a war year.

The estimated capacity for the 14 furnaces which are likely to be built this year is 955,000 tons. None of these is for steel castings. This compares with 525,000 tons for 9 furnaces in 1925, with 375,000 tons

Expansion in Plant Capacity Among Independent Steel Companies Was Particularly Marked in the War Period. The United States Steel Corporation has now apparently about 46 per cent of total ingot capacity, though its proportion was 54 per cent some fifteen years ago



Additions to Open-Hearth Capacity Since the War

Year	No. of Furnaces	Annual Capacity, Gross Tons
1919	9	625,000
1920	20	675,000
1921	8	247,500
1922	8	227,500
1923	19	875,000
1924	7	375,000
1925	10	585,000

Increase in Open-Hearth Capacity

	No. of Furnaces	Annual Capacity, Gross Tons
Completed in 1925:		
Independent companies	6	335,000
United States Steel Corporation	4	250,000
Total	10	585,000
Projected for 1926:		
Independent companies	10	705,000
United States Steel Corporation	4	250,000
Total	14	955,000

for 7 furnaces in 1924, with 819,000 tons for 17 furnaces in 1923 and with 217,500 tons for 6 furnaces in 1922—the smallest projected capacity on record. The largest contemplated additions to capacity during peace years was 3,100,000 tons for 88 furnaces in 1913.

The following companies plan new open-hearth furnaces for 1926:

Tennessee Coal, Iron & Railroad Co., Fairfield Works, four 100-ton furnaces; Weirton Steel Co., Weirton, W. Va., four 150-ton furnaces; Kansas City Bolt & Nut Co., Sheffield Steel Works, one 65-ton furnace; Bethlehem Steel Corporation at its plant at Sparrows Point, Md., three 100-ton furnaces; and also two 100-ton furnaces at its Cambria, Pa., plant.

New Blast Furnace Construction

The feature is the large number of new blast furnaces under construction or contemplated. For 1926 or later 9 furnaces are under way or planned.

Only one blast furnace was completed and blown in during 1925, which parallels the record for 1924, 1914 and 1921. In 1922 only two furnaces were blown in. The furnace which was completed last year and lighted was the 600 to 700-ton stack of the Youngstown Sheet & Tube Co. at its Indiana Harbor plant. It was blown in early last spring.

The record in new furnaces completed in any one year was 9 in 1912 and the record in those projected for completion in any one year was 25 in 1917—a war year. Only 5 were planned for building during the three years, 1921, 1922 and 1923. Three furnaces were actually built in 1921 and 1922. Additions to blast furnace capacity have been few in recent years.

As to blast furnaces completed last year and projected in 1926, the situation as of Jan. 1 is as follows:

Company	Completed in 1925	Under Construction or Projected
Youngstown Sheet & Tube Co., Indiana Harbor Plant	1	..
Central Furnace Co., Massillon, Ohio	..	1
Mystic Iron Works, Everett, Mass	..	1
Hamilton Furnace Co., Hamilton, Ohio	..	1
Hudson Valley Coke & Products Co., Troy, N. Y.	..	1
Weirton Steel Co., Weirton, W. Va.	..	1
Midland Coke & Iron Corporation, St. Louis	..	1
Inland Steel Co., Chicago	..	1
Tennessee Coal, Iron & Railroad Co., Fairfield Works	..	2
Total	1	9

The estimated capacity of the 9 blast furnaces which are planned as additions to the country's capacity is about 1,875,000 gross tons. The new furnaces at Massillon, Ohio; Everett, Mass.; Troy, N. Y.; and at Chicago will be active early this year.

Rebuilding and enlarging of present stacks was extensively carried on last year. The Wheeling Steel Corporation enlarged its Top furnace 10 per cent; the Youngstown Sheet & Tube Co. remodeled and enlarged one of its Youngstown furnaces and its Mayville (Wis.) stack; the Bethlehem Steel Corporation is rebuilding its E stack at its Cambria plant; the Carnegie Steel Co. is rebuilding or has remodelled two Carrie furnaces and one Duquesne, and the National Tube Co. is rebuilding one of its furnaces. These are the more prominent cases.

A large number of furnaces have either been scrapped or abandoned. Many of those hitherto regarded as possible pig iron producers have been removed from official lists. On Jan. 1, 1925, THE IRON AGE carried 403 furnaces on its list; on Jan. 1, 1926, only 379 furnaces are recognized, a loss of 24.

Details of the companies' reports of new construction, completed or planned, are as follows:

The Steel Corporation

New construction and improvements completed during 1925 and under way as of Jan. 1, 1926, by subsidiary manufacturing companies of United States Steel Corporation are as follows:

Carnegie Steel Co.

Completed

Edgar Thomson Works: A 1000-ton hot metal mixer for Bessemer metal in open-hearth plant No. 1; hot metal elevated railroad from blast furnaces to Bessemer and open-hearth departments; new boiler house, 18,000-hp. boilers and auxiliary equipment.

Duquesne Works: Reconstruction of blast furnace No. 2 and stock yard; rebuilding six 75-ton furnaces at open-hearth plant No. 2.

Carrie Furnaces: Rebuilding blast furnaces Nos. 1 and 2, including gas washing system; second 15,000-kw. generator station with boilers and auxiliaries; 6 turbo-blowers with equipment at blast furnaces Nos. 1 to 5.

Mingo Works: Coke unloading plant and power station of two 2500-kw. turbo-generators.

McDonald Works: 10-in. shape mill.

Clairton Steel Works: New boiler plants for blast furnaces and steel works, including boiler feedwater purifying plant.

Under Way

Edgar Thomson Works: Two additional ingot heating furnaces at blooming mill; lengthening 6 hot beds at finishing ends of Nos. 1 and 2 rail mills.

Homestead Works: Installing 44-in. and 54-in. blooming mills, 36-in. roughing mill, 28-in.-32-in. structural and 52-in. universal structural mills in lieu of obsolete mills.

Carrie Furnaces: Rebuilding and additions to ore handling equipment at blast furnaces Nos. 1 to 7, including car dumper and electric ore transfer system.

New Castle Works: New central blast furnace gas-fired boiler plant, including building and 7200-hp. boilers.

Ohio Works: Two 15,000-kw. turbo-generators and auxiliary equipment; 15 waste heat boilers at open-hearth plant.

Upper Union (Youngstown) Works: Electric motor equipment to operate mills, replacing steam power.

McDonald Mills: 12-in. strip mill and 14-in. bar mill.

Farrell Works: 16 800-hp. boilers at blast furnaces Nos. 1 to 3.

Illinois Steel Co.

Completed

South Works: Slag granulating and loading facilities at blast furnaces Nos. 1 to E; additional gas engine driven electric unit in No. 1 power station.

Joliet Works: Equipment to increase producing capacity of Bessemer slabs.

Gary Works: Modernizing ore and coke bins and ore handling equipment at blast furnaces Nos. 5-6 and 11-12.

Under Way

South Works: A 40-in. reversing blooming mill in No. 1 rail mill; merchant bar mill for rolling alloy steels.

Gary Works: 140 additional by-product coke ovens; steam turbo-electric generating plant, including buildings, two 15,000-kw. generators and eight 1200-hp. boilers; new water pumping station building and equipment; remodeling finishing end of rail mill.

Minnesota Steel Co.

Completed

Duluth Works: Equipping 28-in. mill to produce billets for seamless tubes; rebuilding blooming mill soaking pits Nos. 1, 3, 4 and 5.

Lorain Steel Co.

Completed

Johnstown Works: New machine shop building and additional machine equipment; additions to compressed air power system.

Under Way

Johnstown Works: Stoker-fired furnace and auxiliary facilities for central heating station to serve steel foundry drying ovens.

National Tube Co.

Completed

Gary Works: New pipe plant, consisting of 5 butt weld mills, 4 lap weld mills and 1 seamless mill with auxiliary departments and shops.

Lorain Works: Improvements to blast furnaces Nos. 2 and 5; new 10-ton ore bridge; enlarging main building and converting hot end of No. 1 lap weld mill into seamless tube unit, sizes 2 in. to 4 in.

National Works: Rebuilding blast furnace No. 1 and one hot blast stove at blast furnace No. 2; 5 hot blast stoves at blast furnaces Nos. 3 and 4.

Ellwood Works: Sub-station with equipment for additional hydraulic, compressed air and electric power; increas-

ing heating capacity of No. 5 hot mill; additional piercing mill for No. 5 hot mill.

Under Way

Gary Works: 14-in. and 16-in. continuous skelp mills, one 42-in. universal skelp mill and auxiliary facilities.

Lorain Works: 3 turbo-blowers and equipment, replacing blowing engines Nos. 1 to 5; improvements to blast furnace No. 1, additions to 3 stoves at blast furnace No. 2 and 3 new stoves at blast furnace No. 5.

National Works: Rebuilding blast furnace No. 4, four stoves at blast furnace No. 1 and one stove at blast furnace No. 4; larry car system of stock bins at blast furnace No. 4.

Christy Park Works: Two continuous heating furnaces and equipment for cutting and boring seamless coupling blanks.

American Steel & Wire Co.

Completed

Newburgh Steel Works: Water filter plant.

Central Furnaces and Docks: Reconstructing blast furnace D.

Waukegan Works: Two 1000-hp. boilers and auxiliary equipment and increasing boiler feed water pumping capacity.

Trenton Works: Additions to boiler house, improvements in electric power installation and motor-driven wire rope stranding machine and rebuilding 4 rope machines.

Worcester, North Works: 20 heavier-type cold rolling machines for conduit wire.

Worcester, South Works: New crane runway and two 25-ton cranes in open-hearth department.

Worcester, Electric Cable Works: Electrical testing equipment for high tension cables.

New Haven Works: Four 500-hp. boilers with auxiliary equipment; motor-driven wire rope stranding machine and reconstructing six rope machines.

Donora Wire Works: New roughing mill engine for Nos. 1 and 2 rod mills.

Under Way

Newburgh Steel Works: Rebuilding the Bessemer and cupola buildings.

Central Furnaces and Docks: New boiler house, pump house, 10,000-kw. turbo-generator, electric power transmission line to Cuyahoga Works and main water and sewer lines.

American Works: Continuous wire drawing equipment for fine weaving wire.

Rockdale Works: 24 continuous wire drawing machines.

DeKalb Works: 24 continuous wire drawing machines.

Scott Street Works: Replacement of 68 22-in. wire drawing blocks.

Worcester, North Works: Continuous wire drawing equipment for fine weaving wire.

Worcester, South Works: Five 500-hp. water tube boilers.

Worcester, Electrical Works: Increasing capacity for manufacture of enameled magnet wire.

Pacific Works: 10-ton rope layer and extension to rope factory building.

American Sheet & Tin Plate Co.

Completed

American Works: Unaflow engine to drive Nos. 1 and 2 double hot mills, new main steam lines and relocating No. 2 hot mill engine.

New Philadelphia Works: Resetting 4 boilers and equipping with stokers, superheaters and coal and ash handling equipment.

New Castle Works: Rebuilding hot mill furnaces Nos. 5 to 8; mechanical doublers, with shears, for mills Nos. 5 to 20.

Farrell Works: Tractor system for handling plates, including new walls and floor in tin house; 82 mechanical doublers, with shears, were installed at Cambridge, Laughlin, New Castle, Pennsylvania and National Works; water treating systems for pickler and tin house water supply at New Castle, Shenango and Farrell Works were completed; the hot mills were equipped with water-cooled floor plates at various works.

Under Way

New Castle Works: Assorting room, warehouse, shop building, scruff house and extending annealing building to modernize facilities.

Tennessee Coal, Iron & Railroad Co.

Completed

Ensley Works: Two additional stoves at blast furnace No. 6; two 834-hp. boilers at No. 1 steam plant.

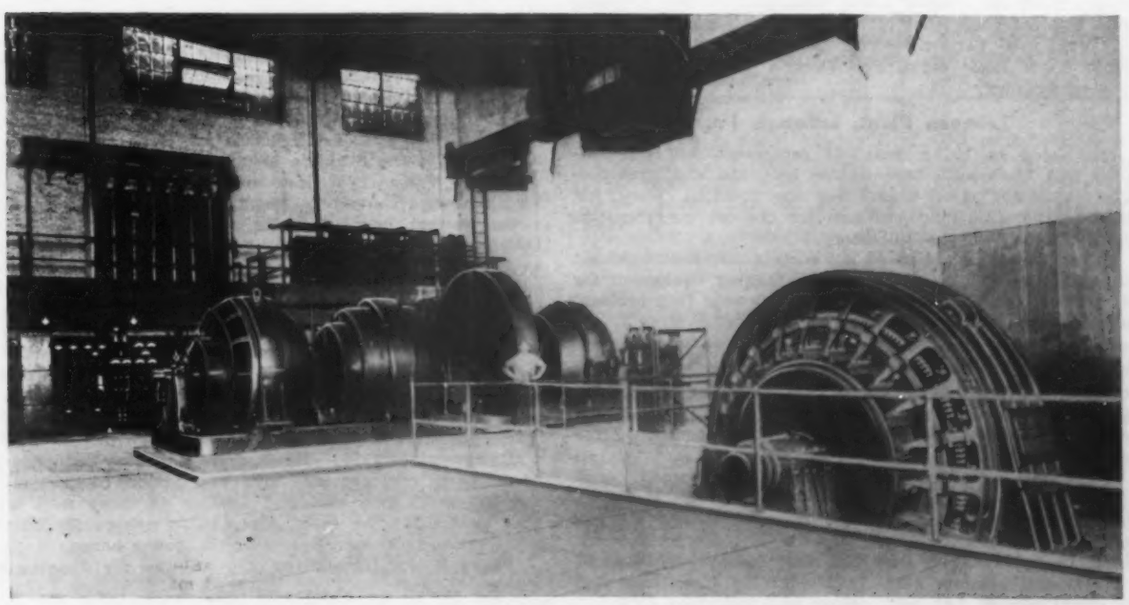
Fairfield Works: Four open-hearth furnaces; 21-in. continuous sheet bar and billet mill; rail fastening department; 11-in. merchant mill warehouse; coke wharves and screening station for batteries Nos. 1 to 4 at by-product coke plant.

Under Way

Ensley Works: Improvements to blast furnaces Nos. 3 and 4; two additional stoves at blast furnaces Nos. 1 and 6.

Bessemer Rolling Mills: Equipping 8-in. guide mill to roll cotton ties.

Fairfield Works: Two blast furnaces, Nos. 5 and 6, with stock handling and turbo-blower equipment; four open-hearth furnaces, Nos. 5 to 8; electric power plant for two 25,000-kw. turbo-generators; sheet and jobbing mill and auxiliary facilities; 77 16-ton coke oven addition to battery No. 7 at by-product coke plant; new boiler house, two



Reversing 4000-Hp. General Electric Motor Driving 38-In. Blooming Mill of the Donner Steel Co., Buffalo. The flywheel set, furnishing power to the reversing motor, consists of a 3000-hp., 2200-volt induction motor driving two 1800-kw. generators

779-hp. stoker-fired boilers and auxiliary facilities at by-product coke plant; modern gas exhauster and saturator equipment at by-product coke plant.

Bethlehem Steel Corporation

The subsidiary companies of the Bethlehem Steel Corporation report the following improvements and additions completed in 1925 and under way at the close of the year at their various plants.

Bethlehem Plant, Bethlehem, Pa.

Completed in 1925: Electrification of hot beds and hot saw at 28-in. structural mill; gas flues and reversing valves for five furnaces at open-hearth plant No. 2; installation of two 950-hp. boilers and improvements to primary coolers at coke ovens; installation of gas producers to supply additional gas for heating ovens at coke ovens; electrification of cold saw and an additional cold saw at structural mills shipping yard; rotary facing machines for fabricating shop; electric door hoists for furnaces at open-hearth plant No. 2; grinder and annealing furnaces for 9-in. mill No. 3; storage building for the Saucon division; additions to the steel foundry consisting of a lean-to, crane runways, sand storage, sand mixing equipment, shake-out machine with elevators, jarring machines, roll-over machine, lengthening core ovens, sand blast equipment and extension to the molding pit; heating furnaces and jib cranes for the drop forging department; sand blenders and slingers for the iron foundry; motor generator sets for the electric power house; Theissen gas washers for electric power house.

Under Way: Electric motor and control for 9-in. bar mill No. 3; deseaming machine for Lehigh bar mills; straightening machine and table for 4-in. rounds at 22-in. mill; coke screening equipment, enlarging quenching pits, lime handling equipment in saturator house at coke ovens; equipment for automobile wheel shop consisting of lathes, boring mills, mechanical tire setter, welder, multi-spindle press, two bolt tighteners, 6 air hoists and outriggers; multiple drill with motor for No. 3 fabricating shop; installation of one six-cylinder Bethlehem oil engine in electric power house; line for blast furnace gas from furnaces to forge department; mixer type ladle, sand mixing equipment and stripping machine for ingot mold foundry.

Steelton Plant, Steelton, Pa.

Completed in 1925: Rail finishing equipment for rail mill; 15-ton soaking pit crane with auxiliary hoist for 44-in. mill; electrically operated rigs for covers of pit furnaces at 34-in. mill; machines for handling and turning rails at the rail mill straightening press; three 1500-k.v.a. transformers for electric power department; trestle at blast furnaces ore bins; sand blast room and equipment for the steel foundry; 25 double truck ingot cars and a new chemical laboratory.

Under Way: Motor drive for 35-in. roughing and 28-in. finishing mills; splice bar quenching equipment and crane runway yard for storing bars; extension to No. 1 power house and rearrangement of equipment; addition to pattern shop and new pattern storehouse; dolomite crusher; 17 double truck ingot cars; two electric welding outfits for the steel foundry.

Lebanon Plant, Lebanon, Pa.

Completed in 1925: Staybolt equipment, hot nut machines and blacksmith hammer for bolt, nut and rivet factories; semi-hot rivet header for the Reading Works; a classifier and a 14-in. water line for the ore concentrating mills; extension to the laboratory.

Under Way: A 16-in.-12-in. semi-continuous merchant mill; a boring mill, hot heading and forging equipment for bolt and nut division at Lebanon; a continuous feed national header for the Reading Works.

Maryland Plant, Sparrows Point, Md.

Completed in 1925: Twelve additional hot mills with necessary furnaces, cold rolls, tin house and warehouse, three mechanical tin pot feeders and blower equipment for the tin mills; continuous reheating furnaces for the rail mill; foundation and trestle for mixer at open-hearth plant No. 1; new stoves for blast furnaces A and C; two coke breeze screening towers at blast furnaces B and C; gas washing equipment at blast furnace B; compressed air equipment for stock bin gates at blast furnace C; 20 ingot cars, 21 steel gondola cars, 10 50-ton side dump cars and one steam shovel.

Under Way: Three 100-ton stationary open-hearth furnaces with necessary building extension, equipment, waste heat boilers, etc.; rod and wire mill including wire drawing and galvanizing departments; nail factory and barbed wire factory; 40-in. motor-driven slabbing mill with three rows of soaking pits, including all necessary buildings and equipment; roller leveller and ventilating equipment for sheet mills; 23 mechanical doublers and shears, two 126-in. squaring shears, ventilating equipment for six hot mills at the tin mills; new stove at blast furnace D; a two-strand pig casting machine; conveyor and loading equipment for shipment of by-product coke.

Lackawanna Plant, Lackawanna, N. Y.

Completed in 1925: A 35-in.-28-in. structural mill, including buildings, cranes, mill equipment, heating furnaces, power lines, billet storage, etc.; motor drive for 48-in. universal plate mill; heating furnaces at 48-in. universal plate mill; equipment to burn coke oven gas in furnaces 1 and 2 at No. 2 mill; two 15-ton soaking pit cranes and electric pump for the 40-in. blooming mill; 800-ton hydraulic slab shear, crop conveyor, slab and billet transfer, crane runway and crane for handling slabs and billets at 40-in. blooming mill; improvement and additions to open-hearth department No. 1 consisting of new stock yard crane runway with tracks, approach trestle and stock platform, enlarging furnaces and reinforcing the crane runways and the floor of the building; 24 sludge car bodies for blast furnaces; extension to crane runway and to stripper building with 200-ton stripper at Bessemer department; 42-in. cold blast main from blowing engine house No. 2 to blast furnace F and G; five Bethlehem gas-driven blowing engines for the blast furnaces; additions to the coke screening station at the coke ovens; fifty 50-ton steel flat cars; transformers and switching equipment for additional Niagara power at sub-station No. 3; 30 coke car bodies.

Under Way: An 18-in.-14-in. structural mill with necessary buildings, cranes, mill equipment, heating furnaces, power lines, gas lines, scale, etc.; electric motor drive for the 12-in. bar mill; narrow gage cars for handling billets and blooms between 40-in. blooming mill and the new 35-in.-28-in. and the 18-in.-14-in. structural mills; motor-driven ingot delivery car for 40-in. blooming mills; pneumatic tube system for conveying samples from the open-hearth departments to the chemical laboratory; gas burners on four stoves at blast furnace A; ladle cars and ladles for the blast furnaces; gas lines for surplus coke oven gas to heating furnaces at mills Nos. 1, 4, 5, 7, 9 and 10 and to the furnaces of the spike, bolt and nut shop; improvements at structural shipping yard consisting of crane runways with cranes, service buildings, cold saw, etc.

Cambria Plant, Johnstown, Pa.

Completed in 1925: Four motor driven bar mills (14 in., 13 in., 12 in., and 9 in.) at Gautier division, including all necessary buildings and equipments; cooling beds for 34-in. billet mill; 30 motor driven wire drawing machines; 8 wire pointers, and 25 additional blanks for wire mill; crane operated strippers for 20 blocks at the wire mill; crane operated strippers in wire drawing departments; twisted wire hook machine for the wire mill; ingot scale for the 34-in. and the 40-in. mill; four 120-ton ladles for the open-hearth department; stone crusher for the Bessemer department; improvements and additions to the stack of blast furnace F; four 75-ton ladles for the blast furnace department; complete rebuilding of blast furnace E; coke screening and loading-out system at blast furnaces H, J, K and L; a 15,000-kw. 6600-volt generating station, including buildings, turbo-generators, boilers, condenser cooling tower, cranes, etc.; boiler house and four boilers with all auxiliaries at the Franklin boiler house.

Under Way: Two open-hearth furnaces for displacing two Bessemer converters, including building extensions and crane bottom house building, etc.; ladle pit for 75-ton ladles at the open-hearth department, lower division; frog, switch and rail anchor department at the Gautier division; expansion to building, including one crane, at 8-in. mill, Gautier division; bale tie building, 150 x 50 ft., for the wire mill; improvements and additions to blast furnace J and a gas main between blast furnaces J and K; loading-out bin for coke screening at stock bins for blast furnaces A and D; automatic gaging rod for blast furnaces G, K and L.

Coatesville Plant, Coatesville, Pa.

Completed in 1925: Motor drive and gear reduction for 22-in. skelp mill; motor drive and pinion foundation for the bar mill; two coal-fired heating furnaces with waste heat boilers for the 22-in. skelp mill; stokers for burning coke breeze under two boilers at the power house.

Under Way: Installation of a machine for flanging and dishing heads.

Youngstown Sheet & Tube Co.

The Youngstown Sheet & Tube Co., Youngstown, completed last year at its various plants the following construction:

East Youngstown Works: The hearth of No. 2 blast furnace is being enlarged from 16 ft. diameter to 20 ft. 6 in. diameter and the bosh increased from 22 ft. diameter to 23 ft. 6 in. diameter. An additional turbo-blower has been purchased to give the increased blowing capacity required and will be installed early in 1926.

At the billet mill three new cooling beds were erected 30 ft. wide by 96 ft. long with the incidental conveyors, accelerating, decelerating and assembly tables approximately 225 ft. long over which the billets are transferred from the mill to the new cooling beds. Two 15-ton, 120-ft. span electric overhead traveling cranes were installed on a runway 353 ft. long to serve these beds and transfer the billets.

A rod storage system, consisting of two electric tram rail hairpin hook cranes for carrying the bundles of rods from the rod mill to either the storage building, shipping truck or the wire cleaning department, was installed complete. This system is capable of handling approximately 17 tons per hr.

A 55,000 cu. ft. turbo-driven blower was installed complete in the blast furnace blowing engine house.

The sheet and pair furnaces at the East Youngstown sheet mill were completely overhauled and improved. Changes were made from coal-fired to gas-fired furnaces.

On the hot mills a patented ventilating system for carrying the dust and grease smokes from the roll necks has been installed. A new natural gas deoxidizing furnace of special design has been added to the present equipment.

Brier Hill Works: Three new continuous furnaces of recuperative type, replacing obsolete equipment, were built at the 84-in. plate mill.

Additional sanitary buildings, equipped with overhead type of lockers, are being installed at the pit furnace and open-hearth departments.

Indiana Harbor Works: The new 700-ton blast furnace, which was under construction during 1924, was blown in during March, 1925. This furnace is 95 ft. in height with a 20-ft. 6-in. diameter hearth and a 24-ft. diameter bosh and is equipped with a revolving distributor, the latest design of skip hoist and gas cleaning equipment. There are four side combustion stoves with a heating surface of approximately 76,000 sq. ft. per stove. One of these stoves was connected with the three stoves for No. 1 furnace to give additional heating capacity for that furnace.

No. 1 furnace was completely relined, equipped with working distributor and copper cooling plates installed above the mantel. The three stoves serving this furnace were equipped with latest type of burners.

A Dorr thickener and filters are being installed at the blast furnaces for reclaiming flue dust and gas washer wastes. A 200-ft. extension has been made to the ore dock.

The acid washer at the coke plant was relocated in a separate building, moved from the light oil building to eliminate the fire hazard. New turbo-driven centrifugal oil pumps have been installed for handling light oil.

Evanston Work: A new pattern storage building has been constructed.

Plugging and reaming machines and an air tester for refrigerator pipe have been added.

Mayville Iron Co.: Blast furnace A was remodeled. The furnace top was equipped with new standard distributor, boom derrick, new bell beams and supports.

Improvements were made to the ore and coke bin equipment.

Auxiliary oil burners have been installed on four 500-hp. boilers.

New construction now under way for completion in 1926 at the various plants as follows:

Indiana Harbor Works: A new 21-in. continuous bar mill with 10 horizontal stands, three vertical stands, rotary and flying shears is now under construction with the incidental bar piling equipment and cooling racks.

Twenty-four 28-in. tin mills with all incidental auxiliary equipment, including shops, office buildings, hospital buildings and welfare buildings are now under construction.

Dehue Operations, Dehue, W. Va.: Slate disposal aerial tramway system is now under construction for conveying slate from the operations to the dump.

Republic Iron & Steel Co.

The Republic Iron & Steel Co., Youngstown, completed last year one butt weld tube mill, with all necessary threading equipment, for the production of 1-in. to 3-in. pipe; also the addition of an electro-galvanizing plant at the company's tube works at Youngstown, for the plating of couplings.

At the company's Thomas furnace at Birmingham, Ala., 57 Becker type Koppers by-product coke ovens, with all necessary auxiliaries, were completed and started up last year.

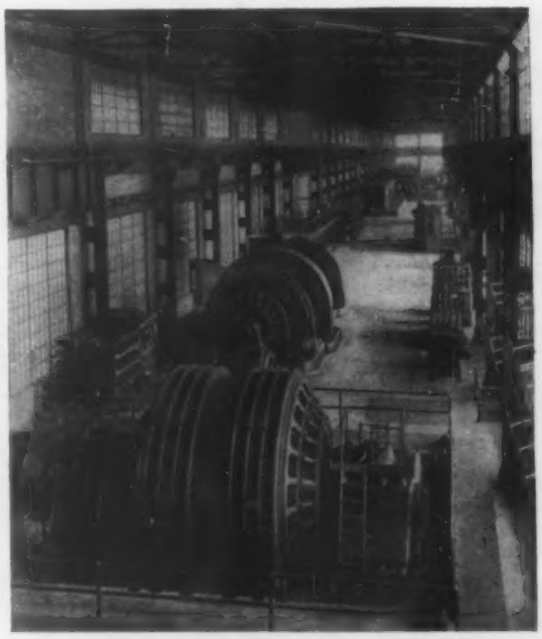
During the present year the company expects to install pig casting machines (3 strands) and one additional blowing engine to the Thomas furnaces.

At the company's Youngstown plant the 10-in. continuous mill, No. 2, will be remodeled and the 90-in. plate mill will be changed into an 84-in. plate and 60-in. universal mill.

Last year the company dismantled its Atlantic blast furnace at New Castle, Pa., and its Hanna furnace at Youngstown.

Jones & Laughlin Steel Corporation

The Jones & Laughlin Steel Corporation, Pittsburgh, built in 1925, at its Aliquippa Works, Woodlawn, Pa., 122 Koppers-Becker type by-product coke ovens, with a daily capacity of 1800 net tons, which the company expects to have completed on March 1; at its Pittsburgh Works, Pittsburgh, 60 Wilputte by-product coke ovens, with a daily capacity of 600 tons, which it is expected will be completed by May 1; in November, 1925, the erection of a concrete bar fabricating plant at the Pittsburgh Works was completed, and in May, 1925, the erection of a terminal and warehouse at Memphis, Tenn.



Reversing Blooming Mill Motor for Sparrows Point Plant of the Bethlehem Steel Corporation. Its maximum momentary capacity is 17,000 hp., 45 r.p.m. The flywheel, motor-generator set, 4000-hp. and 3250-hp. billet and bar mill motors are in background. The equipment is General Electric

Weirton Steel Co.

The Weirton Steel Co., Weirton, W. Va., last year rebuilt all its tin stacks, equipping them with new Poole feeders, automatic tin pot feeders and new tinning machines. It built an addition to the assorting room at the tin mills and rearranged all of the assorting rooms and warehouses in all the tin plate plants. Early in the year the rearrangement of the finishing mills and hot bed on its 16-in. hot strip mill was completed and there was added one additional 16-in. finishing mill with 1500-hp. variable speed motor drive, new hot bed mechanism and new gages and pilers for the hot bed shears.

The company has under way the construction of a scrap yard 750 ft. long, served by a 150-ft. span, 10-ton traveling bridge for handling scrap with a double magnet.

Contracts have been placed for the construction of a

harbor on the Ohio River adjacent to the present coke plant. This harbor is to be dredged for length of 1100 ft. and about 150 ft. wide. The construction of docks for unloading coal from barges has also been arranged for. The coal will also be transported to the company's plant on the river from mines above Pittsburgh. Provisions have also been made for docks for the shipment of finished material by river to ports in the South and Southwest. Contracts have also been placed for a 4-ton unloading tower for unloading the coal from the barges and for a belt conveyor, equipped to deliver the coal from the tower to the coke plant, and for a screening station adjacent to the coke plant. The capacity of the unloader and conveyor is to be 400 tons per hr. It will permit coking coal to be delivered direct to the coke plant or to storage, and also gas or steam coal to be screened and loaded into cars for shipment to the various plant departments. This work is expected to be completed by early summer this year.

A new 800-ton blast furnace will be built during 1926. It will have four stoves. Additional ore bins will be constructed together with a boiler house and a turboblower. The power generating equipment will be augmented and an addition made to the ore yard which will be equipped with an ore bridge and a car dumper. The company will also construct an additional battery of by-product coke ovens, with supplementary gas handling and by-product equipment, to produce an additional 850 tons of coke per day.

The open-hearth department will be enlarged and four furnaces of about 150 tons capacity each will be added.

During the second quarter of this year construction will be started on a new tube mill, having a capacity of about 15,000 tons per month. The size of the sheet mill department will be doubled by the addition of 8 mills, with annealing, pickling, galvanizing and warehouse departments. The present pumping station will be enlarged so as to contain two 30,000,000-gal. pumps.

Wheeling Steel Corporation

The Wheeling Steel Corporation, Wheeling, W. Va., during the present year, will install 51 new Koppers by-product coke ovens with complete equipment at the company's plant at East Steubenville, W. Va., increasing production 50 per cent.

The size of the blast furnace at Wheeling, W. Va., known as Top furnace, will be increased so as to add about 10 per cent to its capacity.

The improvements which were contemplated for completion in 1925 at the company's Portsmouth Works, Portsmouth, Ohio, and Steubenville Works, Steubenville, Ohio, as given somewhat in detail in THE IRON AGE, Jan. 1, 1925, were completed.

There is under way at present the changing of all the mills of the Martins Ferry Works from steam to electric drive.

John A. Roebling's Sons Co.

The John A. Roebling's Sons Co., Trenton, N. J., continued its general plan of improving manufacturing facilities with a view to reduction of costs. Among some of these completed last year were the following:

New rod storage yards with electric cranes at the company's upper works and at the Kinkora plant.

Obsolete wire rope machines replaced by some of more efficient design.

Equipment for rolling wider hot strips added to rod mill No. 2.

The entire steam distribution system at the main Trenton plant replaced for one of higher steam pressure and super heat; three obsolete boiler houses dismantled.

Trucking by animals replaced by motor trucks and a fully equipped garage erected.

Plans for improvements during 1926 are incomplete except that a continuous pickling plant will be built.

Kansas City Bolt & Nut Co.

The Kansas City Bolt & Nut Co., at its Sheffield steel mills, last year put into operation, about April 1, a motor-driven, 24-in., 3-high sheet bar finishing stand for finishing 8 and 10-in. wide sheet bars. This stand has a capacity of 200 gross tons in 8 hr.

It also about the same time completed and put into operation a 2-high, 2-stand, jobbing sheet mill using rolls 46 in., 56 in., 68 in. and 84 in. long, and producing sheets from 20 gage to 3/16 in. thick, from 36 in. to 72 in. wide and from 72 to 240 in. long. The mill is equipped with a Costello continuous bar furnace; a 1500-hp. motor and gear reduction drive; a motor-operated screw-down, a steam-operated lifting table on a roughing stand, a continuous annealing furnace, an 84-in. wide leveller for sheets, 20 gage to 3/16 in. thick; a continuous roller cooling bed; a ½-in. capacity 156 in. plate shear and auxiliary equipment. This mill has a monthly capacity of 2000 gross tons of blue annealed sheets.

During 1926 the company plans to build one 65-ton oil-fired, basic open-hearth furnace with a daily capacity of 130 gross tons.

Central Iron & Steel Co.

The Central Iron & Steel Co., Harrisburg, Pa., carried out the following improvements and additions to its plant last year:

Coal crushing, conveying and driving equipment and an additional pulverizing mill added to the central pulverized coal plant.

The 126-in. plate mill heating furnace equipment for burning powdered coal was completed. It is planned to equip the heating furnaces in three other mills during the present year for burning this fuel.

Two continuous heating furnaces were installed in the 72-in. blue annealed jobbing sheet mill.

Transfer and cooling tables installed for the manufacture of "central pattern floor plates."

Apollo Steel Co.

The Apollo Steel Co., Pittsburgh, last year remodeled one heating furnace to use natural gas and applied to it the latest type of charging device, electrically operated. Four galvanizing pots were also rebuilt and remodeled. A water purifying system, known as the Permutit, was installed, which permits the use of river water throughout the entire plant. A shower and locker room, 20 x 200 ft., made of concrete, for the use of mill employees, was built.

For 1926 the company will convert three additional sheet furnaces to a new type, fired with natural gas. A new mechanical sheet opener is being installed which will open the product of about six mills in 24 hr. It is described as a novel contrivance. Minor additions, such as erecting a fence around the plant, are under way at a cost of $10,000.

Central Steel Co.

The Central Steel Co., Massillon, Ohio, made some extensions to its buildings during 1925 and made various installations to increase the efficiency of its steel plant. A 5-ton, 5-motor low type electric charging machine was placed in the open-hearth department. An extension, 93 x 150 ft., was made to the No. 3 bar mill building, and a 15-ton, 4-motor electric crane with a 90-ft. span, was installed in this extension. An extension 44 x 100 ft. was made in No. 1 billet shed, and a 15-ton traveling crane was installed in this shed. Billet shed No. 3 was extended 44 x 50 ft., and billet shed No. 4 was extended 75 x 88 ft. An extension 60 x 140 ft. was made to the sheet mill department. Four double box annealing furnaces and a 15-ton, 4-motor traveling crane with 67-ft. span were also added to this department.

Colorado Fuel & Iron Co.

The Colorado Fuel & Iron Co., Denver, Colo., recently authorized the building of a structural mill which will cost in the neighborhood of $1,500,000. This will enable the company to roll structural I-beams and channels up to 15 in. and angles of 8 x 8 x 1 in. as well as miscellaneous rounds, squares, etc., when the mill is not busy with structural work. There is also under way a power plant which will form the basis for the

(*Continued on page* 101)

Outlook for 1926 Encouraging---- Unsound Conditions Eliminated in 1925

Business Upswing Expected to Continue Through First Half; No Danger of Overproduction in Steel Industry as Yet

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

1. *Business is well along in an upswing of the cycle which may reasonably be expected to carry well through the first half of* 1926. *If the existing spirit of moderation and caution continues to prevail, the whole year will be a good one. Some recession in the second half, however, now seems probable.*

2. *Fundamental readjustments were effected in* 1925 *which have greatly diminished business uncertainties, thus removing a weight which has held business back in recent years.*

3. *The steel industry at the end of* 1925 *is in a sounder condition than a year ago and no danger of overproduction is yet apparent.*

4. *The current high level of retail trade indicates that consumer purchasing power is large, which is the best basis for business.*

5. *In spite of a growing extension of bank credit and firmer money, ample credit resources exist.*

THE year 1925 fell entirely within a period of upswing in a business cycle. It is not surprising, therefore, that industry and business showed general gains and that they were more active at the end of the year than at the beginning. I am no blind adherent to the idea of "the business cycle," and even consider it possible that cycles as they have been known in the past may disappear, but it is still true that business moves in fairly rhythmical upswings and downswings in which the majority of basic industries participate, and notably the iron and steel industry.

The current phase of the cycle is indicated by the fact that business reached the bottom of the last cyclical downswing about the middle of 1924 and began to pick up almost immediately thereafter. It follows that at the end of 1925 we are about 17 months along in the ascending movement. No one can estimate with certainty how long the rise may continue. In the past it has been fairly common for such upswings to persist for about 20 months, or a little longer. All we can say, therefore, on the basis of analogies with past cycles is that it is easily possible that the current advance may continue throughout the first half of 1926.

One must remember, however, that any individual industry may depart from the general trend, that minor downswings may occur in the course of a general upward movement (as was the case in the first half of last year), and that the periods of cycles are very irregular. Indeed, industry is making progress toward greater stability and with the spread of information and control, the cycles should become shorter and less violent.

1925 a Stable Year

ONE thing is certain, namely, that 1925 was one of the most stable years in our industrial history. Early in the year industrial activity was checked, and declined moderately until a little past the middle, when a general recovery occurred which has carried through the year. Neither phase of this movement in 1925, however, was very sharp and at the end of the year our

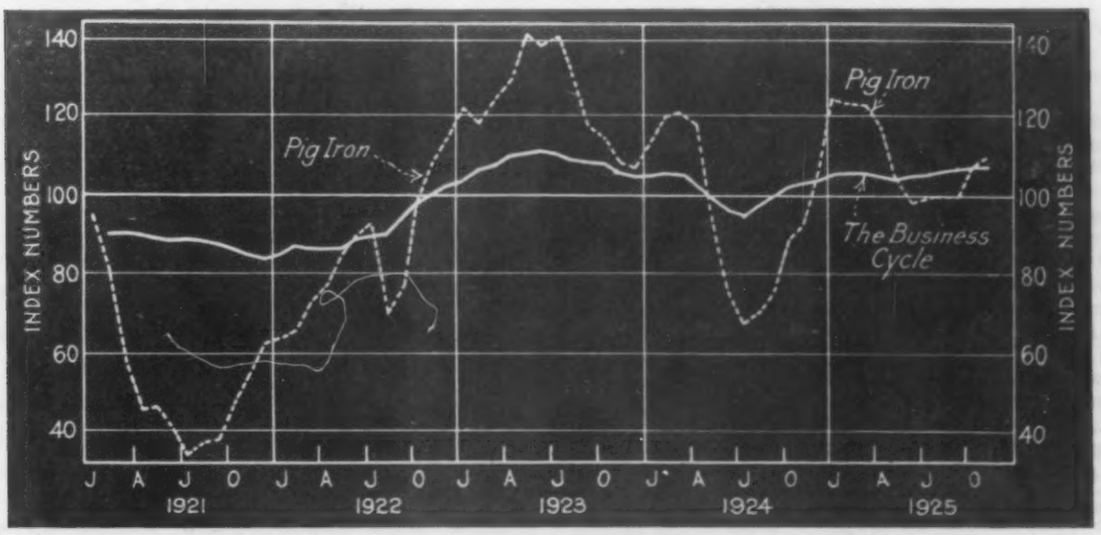


Fig. 1—Pig Iron Output Follows the General Business Cycle Very Closely, With Wider Swings Above and Below Normal

best averages indicate that business as a whole is still a little below the peak reached in 1923. This relative stability is one of the most reassuring factors in the situation and warrants the hope that the prosperity phase of the cycle may be prolonged.

In the first chart which accompanies this analysis is shown a composite index designed to indicate the general course of business, together with the movement of pig iron production.[1] It is apparent that pig iron still justifies its reputation as a thermometer of industry. In a general way it has followed rather closely the cycle curve, merely showing wider swings. Thus we find the pig iron output running far above the cycle curve in early 1925 and falling considerably below it by June of the same year. At the present time it has already swung a little above the general trend again.

Pig iron production may be expected to increase with considerable rapidity during the next two to four months and to reach a volume as great as that attained in early 1925, or even at the 1923 peak. It is to be hoped, however, that the evidences of caution in this regard which have appeared of late will be continued, to the end that a reasonably large output may be prolonged and overproduction prevented. It is almost certain that the farther the pig iron curve swings above the cycle curve the more inevitable will be the downward readjustment.

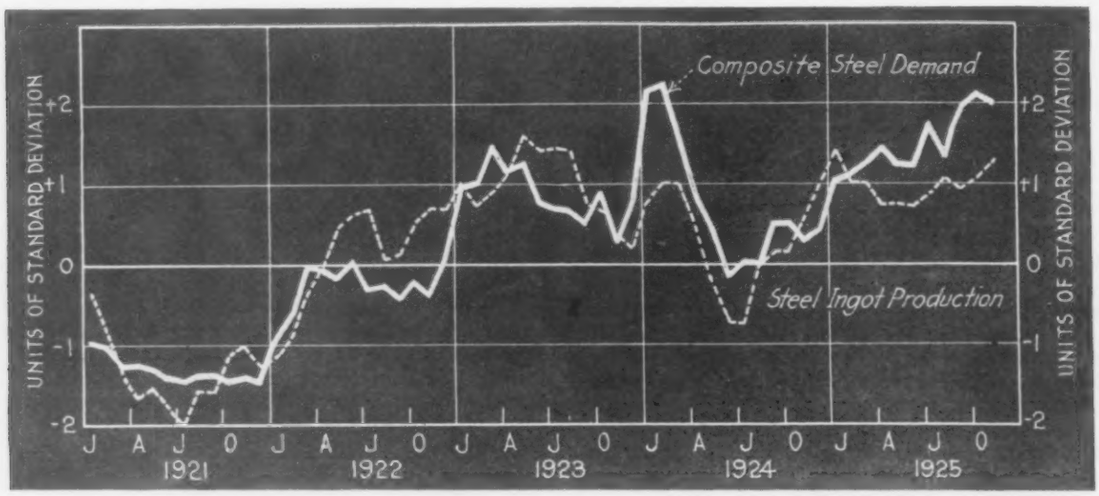


Fig. 2—Steel Ingot Production Compared with Activity in Chief Consuming Industries: Note General Upward Trend During Last Five Years

The Achievements of 1925

IN spite of the fact that on the whole 1925 was a year of remarkable industrial stability, it was nevertheless one of great industrial achievements, which may be summarized as follows:

1. Certain industries which have been backward for several years accomplished their recovery. Among these may be listed farm machinery, leather, textiles, machine tools, oil, fertilizer. All of these were mentioned in my review last year as being decidedly depressed and constituted a drawback on the general industrial situation. All are better at the end of 1925 than at the beginning, and the two which are most closely connected with iron and steel have reached a prosperous condition, with machine tool orders breaking records and the farm machinery production at a high level. It would be hard to find an industry of importance which has not at least "turned the corner" during the past year.

2. Farm prices have been fairly well equalized with the general level of commodity prices and farm credits are pretty well liquidated. That optimism concerning the farm situation was too great at the beginning of the last year is now apparent. Evidently the situation was worse than many had supposed. Further liquidation of farm obligations has clearly strengthened the situation and higher average farm prices during the past year have tended to increase farm purchasing power.

3. The development of economy in railroad operation and the achievement of reasonable profits for the carriers has been one of the outstanding events of the year. To this may be added the important fact that the public relations of the railroads are more satisfactory than has been the case in many years.

4. Marked progress has been made in governmental economy and tax reduction, and in a broad way these developments will help the general industrial situation.

5. Real progress has been made toward international readjustments. The European situation is still bad and surrounded with uncertainty, but looking back over the year one cannot fail to see that conditions in this regard have improved. Much greater certainty concerning the ultimate establishment of the gold standard exists. Progress has been made toward a better understanding of the foreign debt situation and the probability of continued peace in Europe is greatly increased.

6. Incidentally it is worth noting that many new high records in business and industry were achieved in 1925. Railroad carloadings broke records in several months. Bank debits and bank clearings for the year have been exceedingly large. The output of steel ingots is the greatest ever recorded in this country.

The differences between the situation at the end of 1925 and that which obtained a year ago are in part brought out by referring to my summary in THE IRON AGE last January. I then said that retail trade in 1924 had been disappointing. In 1925, however, retail trade expanded at an extraordinary rate and has been one of the strongest features of the year. At the end of 1924 wholesale trade was increasing more rapidly than retail trade, threatening an overstocking of retailers, but the reverse is true this year. In the earlier review attention was called to the fact that the demand from the railroads for iron and steel had proved the strongest factor, while in 1925 it was the automobile and building industries which furnished the great demand.

Iron and Steel Outlook Favorable

A YEAR ago I was rather pessimistic about the outlook for the iron and steel industry, stating that the output could hardly increase more than a few months before overproduction would appear. This year the situation is materially different. Let us glance at the record of the steel industry during the past year.

Ingot production had reached a peak last January from which it declined rather steadily to June. It then

[1] The cycle curve is based on seasonally adjusted indexes of railroad tonnage, manufacturing payrolls and wholesale trade. It represents a three-month moving average. The pig iron curve is adjusted for seasonal variation and long-time growth.

In This Issue

New record for steel ingot output in 1925; 44,000,000 *gross tons.*—Almost 400,000 tons above 1917, best previous year; plants average for year at about 82 per cent of capacity.—Page 1.

Figures for decade indicate annual increase in steel consumption of 1,200,000 *tons.*—Every day adds about 3900 tons to the needs.—Page 54.

Pig iron output in 1925 *was about* 36,750,000 *tons.*—5,350,000 tons more than for previous year; 400,000 tons imported.—Page 4.

Rolled steel production for 1925 *was* 32,500,000 *tons,* 200,000 *tons above previous record in* 1923.—Railroads took 25 per cent; construction work, 17½; automotive, 13; oil and mining developments, 8, and export, 5 per cent of total.—Page 7.

"Replacement is going to be a greater and greater factor in steel requirements." "Rust and wear are bringing new business to the mills in millions of tons every year."—Charles M. Schwab.—Page 73.

Volume of machine tool sales will probably tend to increase until midsummer.—Greater domestic and European demand ahead seen by Col. Frank A. Scott.—Page 12.

Forecasts larger sales for first, but declining volume for second and third quarters of 1926.—Executives of Simonds Saw & Steel Co. use credit, speculation and construction factors in analyzing future prospects.—Page 19.

Consumption of foundry pig iron is apparently declining at rate of 34,000 *tons a year.*—Demand for malleable pig iron, however, seems to be gaining about 14,500 tons each year.—Page 21.

World pig iron capacity put at 108,000,000 *tons annually; U. S. has estimated capacity of* 49,000,000 *tons.*—World steel capacity placed at 117,000,000 tons, of which U. S. has 56,000,000 tons.—Page 22.

We made 60 *per cent of steel and* 55.5 *per cent of world's pig iron last year.* — New world steel record in 1925; Germany now in second place as steel producer.—Page 25.

Restriction of immigration has stimulated use of labor-saving equipment.—Also proves a factor in maintaining high real wages: cheaper labor not synonymous with lower production costs.—Page 28.

New union wage policy based on increase in wages in proportion to increasing production.—High purchasing power needed to maintain high level of production and trade.—Page 31.

Every increase of 1c. *per pound in cost of zinc said to reduce market for die castings* 15 *per cent.*—Die casting plants today faced with serious problem in cost of zinc and aluminum.—Page 33.

Pittsburgh plus decision caused no heavy diversion of tonnage from Pittsburgh last year.—But Chicago has lost much Pacific Coast business: water hauls enable Pittsburgh producers to penetrate South and Southwest.—Page 34.

Less structural material being used outside construction industry.—Consumption of fabricated steel shows 69,000 ton annual increase since 1912.—Page 56.

Estimate nearly 1,000,000 *gross tons increase in open-hearth capacity for* 1926.—Nine new blast furnaces projected, half to be blown in this year: 1,750,000 tons may be added to pig iron capacity.—Page 57.

Steel industry now in better condition than year ago.—No danger of overproduction yet apparent: business cycle expected to maintain upward trend for first half of 1926.—Page 63.

Use of aluminum alloys by automotive industry increasing rapidly. — Non-ferrous metal prospects for this year held to be excellent.—Page 51.

Railroad buying of freight cars amounted to 78,169 *in* 1925: 14,000 *also made in railroad shops.*—Only 1055 locomotives ordered last year; lowest for any year this century, save abnormal 1919 and 1921.—Page 24.

High Lights of 1925—

JANUARY

1. Officers of Henry Ford's railroad stated that they had bought 10,500 tons of Belgian rails at $36.75, Detroit (if sent by all-water route), against $46.72 at Detroit for Pittsburgh rails.

1. Increase of Connellsville coke workers' wages by independents to the H. C. Frick Co. scale. Some independent companies had made the advance on Dec. 16. Pig iron cost increased by $1.

12. Associated Machine Tool Dealers organized at Cincinnati. George E. Merryweather president.

20. Struthers Furnace Co., operating blast furnace at Struthers, Ohio, goes into receiver's hands.

20. Bureau of Census puts the country's steel fabricating capacity at 290,000 tons a month.

29. A. M. Byers Co., Pittsburgh, reorganizes and takes over Orient Coal & Coke Co., at Orient, Pa.

31. Steel ingot production reached its 1925 peak in January with a total of 4,198,564 tons. Highest daily rate, however, was in March. THE IRON AGE composite price of finished steel also reached its high level in January at 2.560c.

FEBRUARY

3. Inland Steel Co., Chicago, announces plans for $7,500,000 improvements and additions to its Indiana Harbor plant.

5. Manufacture of horseshoes at the Shoenberger Works, American Steel & Wire Co., Pittsburgh, is abandoned after a century of production and the equipment is sold to the Phoenix Horseshoe Co., New York.

10. Walter C. Carroll, vice-president of Inland Steel Co., estimates annual savings from simplification of sheet steel sizes at $2,500,000.

10. Protests of Eastern blast furnace operators as to heavy imports of foreign pig iron started a Government inquiry to determine whether anti-dumping law was being violated.

24. Bolt and nut manufacturers abandoned quoting delivered prices within certain zones and returned to plan with three basing points, Pittsburgh, Cleveland and Chicago.

MARCH

1. Pig iron production as March opened was at an annual rate of more than 42,200,000 tons, comparing with 40,361,146 tons, the record year's output in 1923.

2. McClintic-Marshall Co., Pittsburgh, acquires the Bartlett-Hayward Co., Baltimore, large plate fabricator.

6. Supreme Court rules that $30,000,000 in taxes must be returned to ore interests who are entitled to deduct from gross income for mine depletion, contrary to Treasury Department ruling.

9. Central Furnace Co., Massillon, Ohio, starts construction of a 600-ton blast furnace.

12. American Railway Engineering Association adopts the 39-ft. rail as standard instead of 33 ft.

16. Independent coke operators reduced Connellsville wages, going back to 1917 scale, from which advance was made Dec. 16.

26. Prompted by the abolition of Pittsburgh plus, the Union Drawn Steel Co., Beaver Falls, Pa., consolidates with the Peerless Drawn Steel Co., Massillon, Ohio, and the Standard Gauge Steel Co., Beaver Falls.

31. Pig iron production for 1925 reaches its maximum in this month with a total of 3,564,247 tons.

APRIL

7. A reduction of 50 cents a ton in Mesabi non-Bessemer ore depressed the pig iron market, which had already begun to show signs of weakness.

14. American Refractories Institute founded at Pittsburgh; former Gov. William C. Sproul of Pennsylvania later elected president.

15. Supreme Court decision supports right of manufacturers to combine for resistance to unions providing interstate commerce is not affected thereby; ruling of great importance to open-shop organizations.

21. Decision of Interstate Commerce Commission is announced in the famous Jones & Laughlin rate case; held to favor Pittsburgh producers slightly but not regarded as final.

21. Interstate Commerce Commission reduces freight on finished steel from Pittsburgh to St. Louis and Illinois and Indiana points, at the same time increasing rates from Chicago. Pittsburgh was thus given $1.80 a net ton greater leeway at St. Louis in meeting Chicago competition.

MAY

5. Texas Steel Co., Fort Worth, and Knoxville Iron Co., Knoxville, Tenn., ask Tariff Commission for protection against foreign steel dumping.

6. Garvin Machine Co., New York, passes out of existence; lines sold to many manufacturers.

7. Many European machinery men in the United States to purchase equipment.

19. Birmingham becomes a basing point for bolts, nuts and rivets in addition to Pittsburgh, Cleveland and Chicago.

22. Sir Esme Howard, British Ambassador, at spring dinner of American Iron and Steel Institute, urges greater buying of British products to enable England to buy from United States.

25. National Association of Purchasing Agents agrees on standard scrap specifications and uniform scrap purchase contract.

27. Pittsburgh Screw & Bolt Co., Pittsburgh, consolidates with Continental Bolt & Iron Co., Chicago; the new company being one of the largest bolt producers in the West.

28. Henry Ford offers to purchase from the Shipping Board 400 steel ships lying idle in the Hudson; plans to cut them into scrap; Government asks for bids from all interested.

JUNE

1. Far-reaching decision handed down by Supreme Court in Maple Floor Manufacturers Association and Cement Manufacturers Protective Association cases; fixes status of trade associations and permits interchange of statistical information.

17. Charles H. Norton, consulting engineer Norton Co., Worcester, is awarded the John Scott

The Metal Trades in Review

medal for exceptional achievement in the mechanical arts, particularly in grinding machinery.

18. W. A. Harriman & Co., New York bankers, secure a concession to operate manganese mines in Georgian district of Soviet Russia; will export ore.

19. Crash in Stinnes vertical trust imminent; iron and steel trades in Germany in confusion as collapse of huge combine appears inevitable.

23. Federal Trade Commission dismisses price-fixing complaints against farm implement manufacturers.

29. Only steel frame building in Santa Barbara withstands severe shocks in heart of earthquake district.

JULY

2. Rogers, Brown & Co. merge with Crocker Brothers, forming new firm of Rogers, Brown & Crocker Brothers, Inc., pig iron, coke and ferroalloys.

AUGUST

1. Lukens Steel Co., Coatesville, Pa., announced a 10 per cent reduction in steel mill wages effective Aug. 1.

6. John A. Topping, chairman Republic Iron & Steel Co., advocates downward revision of Iron and Steel Institute figures on steel making capacity of the United States; claims institute figures represent considerable obsolete plant. Later elected chairman of committee of the institute to study such revision.

17. New York steel fabricators organize the Structural Steel Board of Trade to aid in elimination of bidding on a per ton basis, substituting lump sum bids.

18. Farm implement and tractor manufacturers became busier than at any time since 1920.

31. Building contracts reach a peak in this month with more than $589,000,000 total in 36 States.

SEPTEMBER

1. Jonathan Warner resigns as president of Trumbull Steel Co., Warren, Ohio, after plans for merger of that concern with the Otis Steel Co., fail; reorganization and refinancing follow.

1. Archibald Johnston, vice-president; Henry S. Snyder, vice-president, and William W. Tobias, manager of purchases, of the Bethlehem Steel Co., resign.

1. Anthracite miners, refusing arbitration, strike to enforce what operators claim are demands impossible to meet. Newspapers urge use of substitute fuels.

3. American Railway Car Institute is organized in New York to carry on the work of the Railway Car Manufacturers Association, disbanded.

4. Contracts closed for the fabrication of steel pipe for an Oakland, Cal., pipe line, requiring 85,000 tons of plates, one of the largest orders of its kind in years.

5. American Car & Foundry Co. is reported to have paid $2,000,000 for plant of Hall-Scott Motor Car Co., at Berkeley, Cal.

14. National Steel and Machine Tool Exposition held in Cleveland in conjunction with the annual convention of the American Society for Steel Treaters.

15. Ex-Gov. Nathan L. Miller of New York is appointed general counsel of the Steel Corporation, succeding the late R. V. Lindabury.

23. Manufacturers, distributers and users of grinding wheels agree to proposal to reduce number of grinding wheel sizes from 715,000 to 255,000.

OCTOBER

5. Sand problems and cost accounting methods feature fall meeting of American Foundrymen's Association at Syracuse, N. Y.

6. Dr. Richard Moldenke first recipient of Joseph S. Seaman medal awarded by American Foundrymen's Association; Dr. Robert J. Anderson given first W. H. McFadden gold medal.

13. Open-hearth superintendents of independent steel companies hold first meeting and discuss operating problems at Cleveland.

13. Demand for coke for heating purposes suddenly becomes a factor in the pig iron market. Sales of such coke were made at $8 to $10, ovens.

20. Susquehanna iron mine, on Lake Superior, property of the Rogers-Brown Iron Co., is sold to a syndicate composed of Hanna, Republic and Inland interests.

22. Riverside works of the National Tube Co., Benwood, W. Va., probably the oldest steel pipe plant in the country, suspends operations.

23. Judge Gary at annual banquet of American Iron and Steel Institute suggests possible cooperation of manufacturers with Department of Justice to permit some degree of price stabilization and the elimination of destructive competition.

29. A structural steel building is erected without rivets by the use of welding at Canton, Ohio.

NOVEMBER

9. Carnegie Steel Co. abandons its Edith blast furnace in Pittsburgh, the fifth old stack to be scrapped by this company within a short time, the others being one at Zanesville, Ohio, two at the Columbus, Ohio, steel works and one at Niles, Ohio.

12. American Institute of Steel Construction in convention at White Sulphur Springs, W. Va., votes to assess members up to 25c. per ton on production to provide funds for campaign of education regarding advantages of structural steel.

DECEMBER

3. Cooperating with THE IRON AGE, the American Refractories Institute inaugurates a service for the solution of refractory problems in the iron and steel industry.

10. Average earnings of manufacturing labor at highest point in five years; average output of manufacturers also reaches record.

15. The $80,000,000 construction program of Bethlehem Steel Corporation at Lackawanna, Cambria and Maryland plants nears completion.

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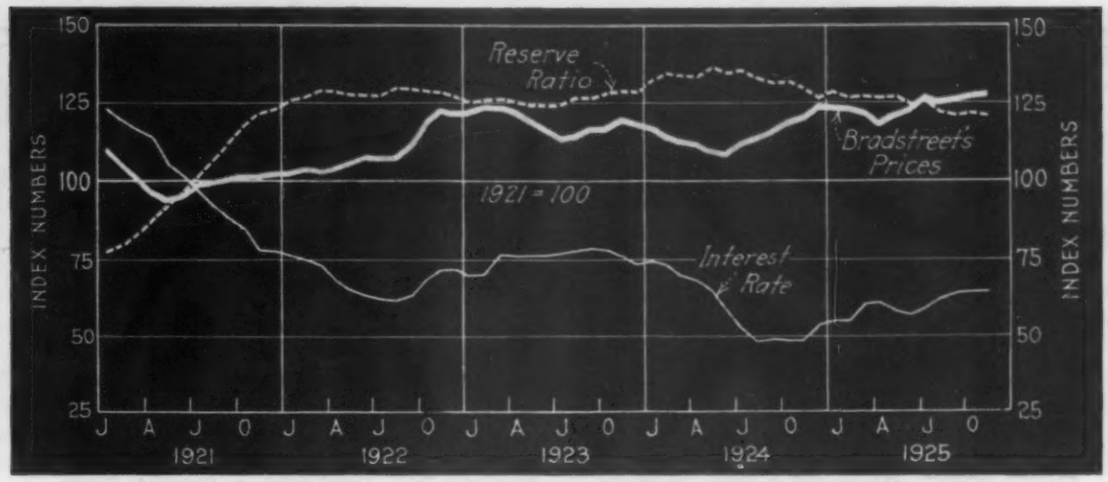

Fig. 3—The Steady but Gradual Decline in the Federal Reserve Ratio Is a Factor in the Rise in Money Rates: Trend Still Upward

recovered, until, if allowance be made for seasonal variation, it is now nearly as high as at the beginning of the year. The total output for 1925, as already noted, was the highest on record. Pig iron production followed much the same course as steel ingots, but has made a somewhat more moderate recovery and is still relatively low. This is a very favorable condition. The ratio of ingot output to pig iron output has increased rather steadily since last April and is now at a point which has not been exceeded since 1922, except in two months of 1924. *This argues well for the pig iron market.*

The consumption of iron and steel as measured by the activity of iron and steel consuming industries has been remarkably great. On the whole the activity in steel-using industries increased during most of 1925, large gains in automobile and building activity more than offsetting declines in railway orders and exports.

The situation is well illustrated in the second chart, which shows the composite trend of activity in the chief steel-consuming industries[2] in comparison with the output of steel ingots. Probably the most notable point revealed is the general upward trend in what may be called the consumption curve throughout the five-year period shown. It is true that the highest point occurred in early 1924, when there was a remarkable combination of activity in the automobile and building industries, but the broad trend has been rather steadily upward throughout the period. There was a short, sharp setback in the first half of 1924, with a steady rise since, until toward the end of 1925 the activity in steel-consuming industries has nearly regained the extraordinary point reached in early 1924.

It will be noted that at the present time the level of steel ingot production is considerably below the consumption trend curve. Back in 1923 the production curve rose above the consumption trend and trouble followed. This was true also at the end of 1924 and again early last year. *Now the moderate level of production compared with activity in steel-using industries insures against an accumulation of unused material and is one of the most hopeful indications for the industry during the first half of* 1926.

No recent year has shown such sustained increase in the potential demand for steel as occurred in 1925. This lends weight to the recent gains in unfilled orders.

[2] The curve is a weighted average of indexes covering railroads, building, automobiles, petroleum, exports, and farming—in that order of importance.

Moderate Price Advances Likely

IRON and steel prices during 1925 showed a gentle decline to July, followed by a short period of stability and then by a small advance in October and November. First coke firmed up, then pig iron, and then steel bars. The year ends with a fairly normal price structure, a notable point being a fair spread between billets and bars. Wire and sheets are still a little low and the spread between pig iron quotations and the price of billets and bars appears to be a little high. But the readjustments required are relatively small and finished steel prices on the whole are fairly well in line with the level of general commodity prices. If any-

(*Concluded on page* 95)

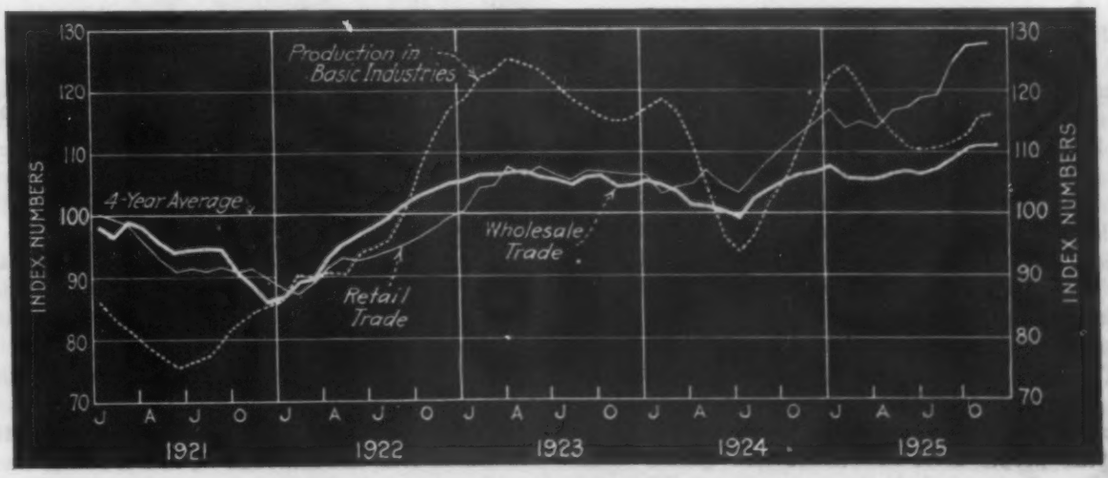

Fig. 4—The Index of Production for the Latter Part of 1925 *Ran Below the Index of Retail Trade and but Little Above the Wholesale Index*

ESTABLISHED 1855

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The Decisive First Quarter

COMING into 1926 the steel trade has within itself tangible evidences of prosperity. It has had three months of increasing production, accompanied by increasing balances of unfilled orders, and is not missing the meaning of a well sustained volume of shipments at a time of year when manufacturing consumers do not take in steel freely unless for early use in production.

So far as any present condition can give promises for the future, such a situation has better assurance for the coming six months than the steel industry had a year ago for the first half of 1925. There was plenty of optimism then, following the election, but it was of the sort that might easily have eventuated in a boom, with the inevitable reaction.

Fortunately, the steel industry had nothing like a boom in 1925; but it had a surprising volume of business even though prices were far from stable. The demonstration that our steel works could so easily produce and the country so easily consume a record tonnage of steel is one of the year's contributions which should not be lost upon the industry. If sellers so will, it may even be turned to account in the interesting three months just before us.

For three successive years the first quarter has been a period of overproduction of steel—not so pronounced in 1925 as in the two years preceding—but in each year, following the first quarter, there has been a falling away in production and prices that has made for instability. Thus it would appear that the operating and selling policies followed by the leading producers of steel in the first quarter of the year have gone far toward determining the year's results. It can be seen, therefore, that the market developments of the early months of 1926 are going to be studied in an unusual way.

The steel industry did great things in 1925. Its vast production machine worked with all the efficiency of the country's transportation machine to give the people steel in volume and quality that had never been equaled. It spent many millions to secure more economical production. It is better equipped today to meet any demands that may be made upon it than at any time in its history. In the light of all the experiences of the past year, it is not unreasonable to expect that 1926 will see definite progress toward the selling of the product at a fair profit. The metal-working industries need and should have the leadership of the manufacturers of steel in making their marketing no less a success than that which they have long had in the field of production.

Killing the Goose

PRETTY much their own affair, are the conferences between anthracite operators and miners. The public is not greatly interested in them, as is evinced by the scant space they get in the daily newspapers. The reports of distress that are coming from the coal fields are far more a matter of concern.

The outstanding thing of the current coal strike is that the northeastern public is learning to dispense with anthracite coal. The anthracite mine owners are well aware of this and are anxious to cut short the educational process. The anthracite labor-leaders are either blind or are playing a gambler's desperate game. Their followers, of course, know little of economic and industrial trends, of this or of anything. That is one of the pitiful things of poor leadership.

In the suburbs of the large cities tank trucks lettered "furnace oil" are now a common sight. The oil-fired domestic furnace is not only more easily regulated than the coal fired, but also it produces no ash to be carted away. Other furnaces are fired with coke which acts just as well, perhaps better than anthracite.

There is developing a great field for semi-coke, the product of low-temperature carbonization, which can be made of the same tenor in fixed carbon and volatile matter as anthracite. Indeed, artificial anthracite, to be made out of bituminous coal, is one of the definite prospects ahead of us.

Finally, we have learned to burn run-of-mine bituminous coal, and although we find it rather more troublesome and observe more smoke from our chimneys, we have also discovered that for a given heat requirement it is cheaper. Throughout the countryside of New England people are expressing

the intention of continuing the use of soft coal by choice if the dealers will stock it, and of course the dealers will do so if the people express the demand.

It looks, therefore, as if the stubborn labor leaders, who are holding out for higher than war-peak wages, and the firming of union monopoly by virtue of the check-off, are strangling the goose that laid the golden eggs, i.e., the wages that have already risen to something like 2.5 times the pre-war. Even if they should carry their point the outcome now would probably be in the nature of the dangerous economic anodyne of an extravagant card rate realized only for part-time work; and the higher this should be the more would the industry suffer by competition. On the other hand the people at large will relish an emancipation, even if it be only partial.

Brittle Duralumin on the Shenandoah

A LARGE mass of controversial matter about personalities, automatic gas valves and errors in judgment is cleared away by the final report of the Naval Court of Inquiry on the loss of the Shenandoah, made public Saturday. It has been decided that the airship was carefully and conservatively designed and constructed, had been properly maintained, and had proved airworthy even when torn from her mast by a violent gale. She went to pieces on Sept. 3 as the result of a storm—in the official language, "due primarily to large, unbalanced, external, aerodynamic forces arising from high-velocity air currents"—while being navigated by a complete crew of highly competent and brave men. The disaster was not due to valves or valve covers, to changes in the ship after its design, or to structural deterioration, but was pronounced to be "part of the price which must inevitably be paid in the development of any new and hazardous art." *Requiescat in pace.*

One very serious matter was disclosed, however, which deserves and undoubtedly will continue to get the closest study. The Naval Court reports that tests on the duralumin from various portions of the wreck, and on other samples in storage, showed

> deterioration of the material in the form of intercrystalline corrosion, which deterioration to the extent found does not affect in any substantial degree the ultimate tensile or compressive strength or the modulus of elasticity of the material, but does largely reduce its ductility.

Even though the official opinion is that this was not a direct or indirect cause of the loss of the ship and does not indicate that use in future airships is unsafe or inadvisable, it is obvious that the metallurgical world cannot accept this verdict with equanimity.

It is no secret that serious damage was done to the Shenandoah's skeleton by the careless handling of anti-freeze solutions when the water-recovery system was first installed. But these members were all replaced. The action which destroyed the ductility of the metal was by no means so simple, nor so easily discovered. According to the testimony, individual members here and there showed pronounced change in surface appearance. Other members, apparently in excellent condition, revealed low ductility on test; however, similar ones did not. Viewed under the microscope, the affected members had minute surface cracks, a few thousandths of an inch deep, occurring *between* the metallic crystals, not through them. No explanation of this sporadic deterioration was advanced.

When it was first being studied, its peculiar action raised doubts of its permanence. In general, all our experience with metal leads us to associate with it the idea of permanence. Lead is soft, and if left indefinitely at ordinary temperatures it remains soft. A bar of iron will be just as strong after ten years' storage in a warehouse as it is today. A hardened steel blade retains its temper through the centuries.

How strange, therefore, to discover an alloy that was relatively soft after a quenching, but which at room temperature gradually increased in hardness and strength for days or months thereafter. One cannot help wondering whether the increase would go on indefinitely or whether, indeed, any part of it would persist permanently. The action was unique in metallurgical experience.

Close study of these problems, however, has shown them to be explainable by the same principles which explain the hardening of steel; the main difference is that the critical temperatures of the two are far apart. Knowing this, there is now little cause for fearing lack of permanence in the age-hardening of duralumin. Systematic studies of aluminum alloys have also revealed many other compositions with remarkable properties, some of which rapidly go to pieces in wet tropical countries, although perfectly satisfactory in temperate zones. Alloys of the duralumin type, however, have shown negative results when tested for susceptibility to season cracking.

However, now come the studies on the duralumin made in America for the Shenandoah. Part of it developed troubles very similar to season cracking. Fortunately, enough is known about intercrystalline corrosion (at least as it exhibits itself in the "season cracking" of brass) and the nature of the aluminum alloys generally to warrant the belief that this disease in duralumin will rapidly be diagnosed, and a cure provided, so that future airships will be immune from this incipient danger.

A World Steel Record in 1925

FOR the seventh consecutive year the prediction has failed, that after the war a "world hunger" for steel would flood the producing countries with orders. Measured by the exports of 1925 the world's needs are still less than in 1913. The analysis on other pages shows, however, a marked expansion—last year the exports of the six leading steel producers were 95 per cent of those of 1913, whereas in 1924 they were about 81.3 per cent.

Several notable records were made: France got to a new height in output and exports; Germany resumed her pre-war position as second only to the United States in pig iron and steel production, exceeding any records since the war; the American industry increased its proportion of the world's total output, though the exports fell to a new low point, with the other five nations greatly in excess.

A new emphasis was given to the influence of scrap in steel making, pig iron being greatly exceeded by steel. In the United States the spread was no less than 8,500,000 tons last year, a new record.

Available figures indicate a new record in world steel production for all time, the 1913 total being exceeded for the third year since the war. Pig iron again fell behind the pre-war performance. The predominance of the American industry continues, its steel being 60 per cent of the combined totals and its pig iron 55 per cent.

Last year 75,285,000 tons of steel and 66,143,000 tons of pig iron was made—a spread of more than 9,000,000 tons, compared with only 3,000,000 tons in 1913.

Advantages of Steady Trade

THIS is an opportune time to point out the advantages of steady trade in steel, for the year just ended has given an illustration in actual practice: Trade in 1925 was steadier than the average since the war, and the year makes at least a fair comparison with the course of affairs before the war.

One method of measuring the steadiness of the steel trade in a given year is to observe the divergence of the highest and lowest rate of steel ingot production from the average for the year. The comparison for the six years 1920-1925 is made in the following table. The first column shows the percentage excess of the year's high month over the year's average, the second column the deficiency of the low month from the year's average, and the third column gives the sum of the two divergences:

	Ingot Producing Rates		
	Largest Per Cent Above	Largest Per Cent Below	Sum of Divergences
1920.....	+11	—19	30
1921.....	+57	—41	98
1922.....	+18	—13	31
1923.....	+13	—18	31
1924.....	+37	—39	76
1925.....	+13	—16	29

Other times, other customs. No one familiar with the philosophy of steel makers in the old days is likely to deny that in times of light demand there was a hope that requirements would accumulate so as to make an impressive showing later. A revival in demand was not highly regarded unless it promised to be a big one. The idea was that if prices once could be lifted they would hold for a considerable period.

In these post-war times the experience has been that if buying exceeded the prospective requirements the period of extra buying would give way promptly to one of light buying, in which the market would probably be injured more than it had previously been benefited.

By the comparison made above 1925 was, by a small margin, the year of steadiest operation. Yet the variation that did occur is in itself testimony to the advantage of uniformity. The year's highest rate of ingot production was reached in March, the lowest rate being in July, only four months later. Increasing production after July confirms the view formed from other considerations, that there was no great decrease in steel consumption from March to July, in line with the decrease in production. There was excess production in March and correspondingly deficient production later. It would have been better if production had been steadier still in 1925, and the hope of the whole trade is that it will be steadier in 1926.

Industrial Standardization Progressing

A system of limit gaging, together with a comprehensive scheme of fits, is probably the most important project thus far carried through by the American Engineering Standard Committee, according to C. E. Skinner, chairman of the committee in a review of developments in industrial standardization during 1925. It is regarded as laying the basis for the carrying out of complete interchangeable manufacture on a national scale, as well as for facilitating mass production within the individual factory, and it is expected that when this work permeates the structure of American industry, the savings will run into enormous figures.

The list of projects now before the committee totals 218, including 76 approved standards. A comprehensive program for the standardization of drafting room practice has been recently launched and is expected to result in large economies. A national agreement has been reached on a safety code for aeronautics and progress has been made in the field of industrial safety, mining and in the several other fields of standardization in which the committee has been working. An important development has been the interest of major executives in the industrial standardization movement, a committee of such executives having been organized within the year to serve in an advisory capacity to the standards committee. Although standardization on an international scale is still in its infancy there have been some accomplishments during the year. Getting organizations of distributers to play their proper role in the standardization movement is regarded as a problem on which marked progress should be made in the coming year.

Puddlers' Wages Remain Unchanged

YOUNGSTOWN, Jan. 5.—For January and February, the tonnage rates paid puddlers and bar iron finishers in mid-Western mills subscribing to the sliding scale wage agreement of the Amalgamated Association of Iron, Steel and Tin Workers continue unchanged from the two preceding months. At the bi-monthly examination of sales sheets conducted Jan. 2 at the offices of James H. Nutt, secretary of the Western Bar Iron Association, Youngstown, the average selling price of bar iron covering shipments for the 60-day period ended Dec. 20 was disclosed as $1.95 per 100 lb. This is the same average as the sales sheets revealed two months ago.

Puddlers are paid, under this selling price, $11.13 per ton, while finishers receive rates 44½ per cent above base. Mr. Nutt acted for the manufacturers in the settlement and M. F. Tighe, Pittsburgh, president of the Amalgamated association, for the workers. Owing to the holidays, the examination was delayed about 10 days. The settlement to determine rates for sheet and tin mill workers will be conducted about Jan. 10 at Youngstown. Mr. Nutt is also secretary of the Western Sheet and Tin Plate Manufacturers Association, which conducts for employers the bi-monthly settlements and the yearly wage conferences with representatives of employees.

The Phoenix Iron Works Co., Meadville, Pa., fabricator of steel tanks and other plate work, has been reorganized by its new owners as the Mead Penn Iron Works. The capital stock is $500,000. Otto Kohler, Meadville, is president.

An "Iron Age" Interview with Mr. Schwab

(*Concluded from page* 11)

new building are going on all the time, and the obsolescence factor is very high. Is there any possibility of a more uniform operation of the industry, even at the cost of accumulating pig iron and ingots or semi-finished steel in times of slackened demand, and thus get on without building blast furnace and steel ingot capacity that can be fully occupied only under boom conditions?"

Spending Millions to Lower Cost

"The fact is that in recent years we have come to a point in the development of the industry where our expenditures are very largely for the purpose of lowering cost and not to provide additional pig iron or steel making capacity. The 25 millions we have been speding at Lackawanna and the 20 millions at Johnstown were not to provide greater output, but to lower the unit cost of the steel produced at those plants. And, by the way, the Bethlehem Steel Corporation now has a steel making capacity equal to that of the United States Steel Corporation when the latter was formed. So far as I know, comparatively little actually new capacity is just now under construction or projected in the country. To go on making pig iron or steel when demand falls off and carrying it to await a pick-up would be uneconomical. What the steel companies have been doing for some years has tended to iron out inequalities in producing cost and bring our plants to a maximum of efficiency. We have reached an advanced stage in this movement of rebuilding to reduce cost, and have a right to look for an adequate return on the large investments we have made. The cost of a modern blast furnace or open-hearth plant is now about three times what it was 20 and 25 years ago."

These last two statements of Mr. Schwab prompted the question, "What is the prospect for a better return on the capital invested in steel plants? While there has been no complaint of the volume of business in 1925, much has been said to the effect that sharp competition has cut down profits unduly."

Profits Are Not Adequate

"It is true that the steel manufacturers have not been getting the prices they should for their products. Take the Steel Corporation. Even with its ownership of ore roads and other lines, its large-scale cement manufacture, etc., its earnings represent only about 5 per cent on the investment, counting the book value of its common stock at 220. That is too little margin for an industry in which the capital requirements for renewals and for efficient production are so large. I believe, however, we are learning from experience, and that destructive competition will more and more give way to a reasonable competition that recognizes the rights and interests of others.

"Under the recent decisions as to what may legally be done by manufacturers in cooperation, it should be possible to obtain fair prices with due regard for the interest of the buyer and the public. I believe we can apply a better philosophy to the marketing of our product. It is always possible by cutting prices to get more tonnage. I might go after the other fellow's trade and get some of it, but my experience has been that he was as certain to take business from me in just that way. The result was that at the end of the year each would find he had done no more than he would have had under a policy of live and let live—and without getting a fair profit.

"I have said, and I am still of the opinion, that in the steel industry our manufacturing methods have been better than our selling methods. Judge Gary's comments at the last meeting of the American Iron and Steel Institute as to what may fairly and legally be done to avoid destructive competition were quite appropriate and suggestive.

"There were days in the steel business when, by reason of excellence of plant and management, one firm had decided advantages over another in the cost of production. Today the underlying principles in the manufacture of steel are so well understood and so generally practised that the differences in the cost of manufacture have become very small, so small that destructive competition cannot be safely practised. We have advanced in our operating departments, in our methods of doing business, in the greatness of our capital; I predict just as much advancement in the future in the method of disposing of our products."

Millions of Tons for Replacement

"In what lines," Mr. Schwab was asked, "are we to look for the greatest expansion in the use of steel in the next ten years?"

"I look for a large increase in steel consumption in every line. You may recall some of the predictions I have made on this matter. It was only a few years, you remember, after the Steel Corporation was formed that we made twice as many ingots as in the year before its organization. We shall see large increases in railroad and building consumption, in the oil industry, and in power and all public utilities requirements. Also there will be a marked growth in the great diversity of smaller uses, as you have frequently pointed out in THE IRON AGE—an increasing penetration of steel into the everyday life of the people. This country is the world's big workshop. As I said in speaking at Indianapolis a few days ago, we have in the United States only 6 per cent of the people on the globe, but we do half the world's manufacturing. And manufacture means steel.

"Replacement is going to be a greater and greater factor in the country's steel requirements. The amount of steel in use has reached such proportions that rust and wear are now bringing new business to the mills in millions of tons every year."

"Will you comment, Mr. Schwab, on the workings of Bethlehem's plan of employee representation?"

"Nothing that I have ever had to do with has given me more satisfaction. Bethlehem employees take as much interest in voting for their representatives on our works committees as they do in going to the polls in a civil election. The committee method of handling shop questions abolishes the worst evil of the old system—the autocratic methods of some foremen. Personal feeling, perhaps growing out of family differences, was often a trouble maker. Now, if there is any complaint, it comes right out in the open, and any man with a grievance has his chance to be heard. And if fault is found with a workman he can know what it is and be represented when his case is taken up. It was not easy at times for some of our foremen to have their decisions reviewed and perhaps reversed; but the justice of the employee representation method and the great improvement it has brought about in works morale are making more and more friends for the plan."

Unfavorable Year in Lake Superior Ore

Transportation Machinery Never Worked to Better Effect, but Earnings Suffered Seriously—Bessemer Differential Wiped Out—Term Contracts a Feature

AN outstanding feature in the Lake Superior iron ore industry in 1925 was the rapid handling of ore throughout the entire season all the way from the mines to the points of consumption. During the preceding two years the industry was fairly free of transportation troubles, but there was further improvement in the dispatch last year, so that there was an uninterrupted flow of ore from mines to the furnaces. Complete cooperation between the railroads at both ends of the lakes and the lake carrying fleet, as well as adequate handling facilities both in cars and in dock equipment, made this possible.

One of the troubles of previous years was the congestion of loaded cars at upper lake ports waiting for boats to take their ore, and consequently delays in "empties" getting back to the mines. This was not in evidence last year, nor was there a congestion at lower lake ports of boats waiting for considerable time to get to unloading plants. With every cog in the ore transportation system running smoothly, some of the boats made a record of a round trip from the head of the lakes to Ohio ports once a week for months at a time, going up light and returning with ore.

Unequaled Transportation Facilities

The excellent transportation facilities made it possible to adopt and adhere to closer shipping schedules than heretofore, which is often an advantage to the consumer. This is illustrated by the case of one consumer who stipulated in his contract that 1700 tons of ore should be delivered to his furnaces every week. A few years ago a shipper would have refused to make such an agreement, knowing that its fulfillment would have been next to impossible. However, the seller in this case readily agreed to the delivery terms and the specified amount of ore was delivered every week throughout the shipping season.

One result of the excellent dispatch was that ore firms were able to clean up their shipments earlier than usual. Only one cargo was shipped in December, this having been ordered very late in the season to permit the starting up of the stack of the Struthers Furnace Co.

Profits Were Lacking

From the shippers' standpoint 1925 was a satisfactory year in the ore trade in all ways except the one that counts most. Prices were cut 50c a ton following an 80c cut the previous year. As a result, the financial showing of the mining industry as a whole was very unsatisfactory. Many operated at a loss, some ended the year about even, and a few made some profit. The margin between selling prices and production costs was so close that it required high efficiency in management and the use of every economy to keep some of the mines out of red ink. Naturally the mines in the most favorable position from an earning standpoint were those having low production costs and marketing a large output, and at the same time not handicapped by unfavorable long-term contracts.

Consumption Midway Between 1923 and 1924

The apparent consumption of Lake Superior ore for the year ended Dec. 1, 1925, was 54,344,463 gross tons, as compared with 45,927,231 tons during the preceding twelve months and with 62,661,460 tons from Dec. 1, 1922, to Dec. 1, 1923. Lake shipments last year were 54,081,298 tons and all-rail shipments are estimated at 1,500,000 tons, making a total of approximately 55,581,298 tons, or 1,236,835 tons more than the amount reported consumed. The amount reported in furnace yards and on docks Dec. 1 was 41,685,888 tons, or 957,853 tons more than on the same date a year ago. The difference between the figures showing the excess of shipments over consumption and those showing the increase in amount of ore in furnace yards and on docks Dec. 1 is due to different methods of compiling furnace consumption reports and figures showing stocks. However, the compilations indicate that in round figures ore shipments for the year exceeded consumption for the twelve months by about 1,000,000 tons.

With increased shipments last year and more ore in furnace yards and on docks Dec. 1 than the year before, the dock balance Dec. 1 was less than on the same date the previous year, being 7,856,154 tons on Dec. 1 as compared with 8,049,276 tons on the same date in 1924, and less than in any year on that date since 1907. This indicates the increasing tendency among consumers to take direct ore rather than to store it on docks. The net difference in costs to the consumers in putting ore on docks and later shipping it to the furnaces, as compared with shipping it direct to the furnace, is 25c a ton for dock-handling charges or the equivalent of 50c per ton of pig iron. This does not include the 1c per ton per month storage charge on docks.

Passing of the Bessemer Differential

The 50c price cut last year brought Mesabi non-Bessemer ore, the base grade, down to $4.25 a ton. However, in addition to this price reduction there was wiped out the differential in the guaranteed iron content between non-Bessemer and Bessemer ores which had existed for 18 years, and Bessemer ore, which had been sold on a guarantee of 55 per cent iron natural, was placed on the non-Bessemer guarantee basis of 51.50 per cent iron natural. This meant a reduction of 60c to 70c a ton in the price of Bessemer ore. The new prices established a fixed differential between Bessemer and non-Bessemer ore of 15c a ton. The price differential had previously been 75c a ton between old range Bessemer and non-Bessemer ore, and 65c a ton between the two grades of Mesabi ore. However, based on 51.50 per cent iron content, the price variation between the two grades had been from 27c to 48c. The change in the price differential was made because the price spread between Bessemer and non-Bessemer grades had long been regarded as too great. The change in the guarantee of iron content was made to prevent confusion and to make it easy for consumers to make price comparisons.

With the 1925 reduction, prices were still above the pre-war level, but lower than at any time since 1916, when Mesabi non-Bessemer ore was $3.55.

Ore prices were established on April 4, the same date as in the previous year. It was thought that deep price cuts would eliminate price shading, which had been a disturbing factor in the previous year. But such hopes were soon dashed, as weak spots developed, with concessions of from 25c to 50c a ton. Later the market strengthened, and there was little if any varia-

tion from the April price during the last half of the season. Quite a little was done early in the season in term contracts covering periods of three to five years, including the current year's requirements. As has been previously pointed out, open market buying has been decreasing from year to year, and these new term commitments have taken more consumers out of the market until the expiration of their contracts.

PERSONAL

Don Ferguson has become general sales manager Miller-Morse Hardware Co., Winnipeg, Man., Canada, and not purchasing agent, as stated in our issue for Dec. 24.

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F. C. Carew has resigned as a member of the sales force of the Trumbull Steel Co., Warren, Ohio, after six years' service, to become district sales manager at Cleveland for the Regent Steel Co.

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Charles H. Elliott has assumed his new duties as vice-president in charge of operations of the Trumbull Steel Co., Warren, Ohio, having resigned as superintendent of the South Side Works, Jones & Laughlin Steel Corporation, Pittsburgh. Mr. Elliott will be in complete charge of the operating department of the Trumbull Company, working under President-elect John T. Harrington.

—

Walter B. Higgins and George W. Moore have been elected directors and vice-presidents of the Wheeling Steel Corporation, Wheeling, W. Va., the former in charge of sales and the latter in charge of operations. Mr. Higgins has been general manager of sales since Aug. 1, last, when he succeeded W. H. Abbott, and in all has been with the corporation and its predecessors for 25 years. He was assistant manager of sales of LaBelle Iron Works, Steubenville, Ohio, when that company, the Wheeling Steel & Iron Co. and the Whitaker-Glessner Co. were merged into the present Wheeling Steel Corporation in 1920. Going to Wheeling that year as an assistant manager of sales for the combined companies, he was made a division manager of sales in 1923, when the Wheeling Steel Corporation, originally formed as a holding company, became an operating company through the surrender by the constituent companies of their separate charters. This position he held until appointed general manager of sales. Mr. Moore also has been identified with the corporation for many years. He was manager of the Portsmouth, Ohio, works prior to his transfer to Wheeling a few years ago to become assistant to the late Andrew Glass, who as general manager supervised both sales and operations of the Wheeling Steel Corporation. Previously Mr. Moore was assistant to A. J. McFarland, whom he succeeded upon Mr. McFarland's promotion to the presidency of LaBelle Iron Works.

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Robert H. Dibble has been appointed metallurgical engineer American Sheet & Tin Plate Co., Pittsburgh, effective Jan. 1. Mr. Dibble has been associated with the company for more than 25 years and latterly has been chief of the inspection bureau of the operating department. He is a graduate of Carnegie Institue of Technology, class of 1910.

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William C. Tamplin has been appointed assistant to W. A. Irvin, vice-president in charge of plant operations, American Sheet & Tin Plate Co., Pittsburgh. He has been identified with this company for about 25 years, for the past 10 years as special representative of the operating department.

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William H. Phillips, formerly manager of works and engineering, R. D. Nuttall Co., Pittsburgh, has become associated with the Molybdenum Corporation of America, Empire Building, Pittsburgh. He will retain his connection with the Nuttall company in a general consulting capacity.

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J. B. Jamison, formerly Pittsburgh district sales manager for the Union Drawn Steel Co., Beaver Falls, Pa., has resigned to become associated with the Standard Steel Specialty Co., Beaver Falls, as secretary and general sales manager.

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S. A. Dinsmore, formerly Chicago district sales manager Standard Gauge Steel Co., Beaver Falls, Pa., has become associated with the Standard Steel Specialty Co., as Western sales manager, with offices at 327 South La Salle Street, Chicago.

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Arthur Dufort, who has been associated with L. J. Lowe, Philadelphia district sales manager Wheeling Steel Corporation, for the past five years, has been promoted to the position of St. Louis district sales manager, succeeding M. F. McClaren, resigned. Mr. Dufort has been identified with the Wheeling Steel Corporation since 1912, when he entered the employ of the Wheeling Steel & Iron Co. He worked in the mills of that company until 1920, when he was transferred to the sales department and appointed an assistant to Mr. Lowe in Philadelphia.

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H. H. Hines, formerly sales agent in charge of the San Francisco office, and assistant to E. E. Goodwillie, Pacific Coast manager of sales of the Bethlehem Steel Co., has been placed in charge of the Bethlehem company's Canadian sales with headquarters in Montreal. He has been succeeded by Harold E. Gray, who for several years has been sales agent at Los Angeles. Leigh B. Morris has been appointed sales agent at Los Angeles.

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Announces Personnel of Standard Steel Specialty Co.

The officers of the Standard Steel Specialty Co., Beaver Falls, Pa., announcement of the organization of which was published in THE IRON AGE, Dec. 10, are as follows: E. J. Wagner, formerly secretary and general manager Standard Gauge Steel Co., Beaver Falls, Pa., president and treasurer; Alex Gilliland, president Duff Patents Co., Pittsburgh, and treasurer National Mortar & Supply Co., vice-president; J. B. Jamison, formerly Pittsburgh district sales manager Union Drawn Steel Co., secretary and general sales manager. They, with W. B. Gilliland, associated with the Duff Patents Co.; Dr. J. S. Louthan, director Farmers National Bank and the Ingram-Richardson Mfg. Co., Beaver Falls; Theodore S. Smith, Pittsburgh manager Harris, Forbes & Co., and W. S. Brown, president W. S. Brown & Co., Pittsburgh, constitute the board of directors.

The company has taken over that portion of the business of the Union Drawn Steel Co., owner of the Standard Gauge Steel Co., devoted to the manufacture of machine and Woodruff keys, machine racks, taper pins and other machine steel shapes. Plans are being made for the erection of a new plant this coming spring, the location of which will probably be in Beaver Falls.

(*Personals concluded on page* 100)

Decided Gain in December Iron Output

Daily Rate Increased 4086 Tons or 4 Per Cent—Gain of 14 in Active Furnaces—Production Last Year 36,403,470 Tons

WITH complete data received from every active blast furnace, the pig iron production of the country for December made a decided gain over that for November. The daily rate last month was 4086 gross tons higher than in November, an increase of about 4 per cent. In November the increase over October was 3 per cent; in October it was 7.3 per cent over September.

The production of coke pig iron for the 31 days in December was 3,250,448 tons or 104,853 tons per day, as compared with 3,023,006 tons or 104,853 tons per day (revised) for the 30 days in November. The December daily average was close to that of April. In December, 1924, the production was 2,961,702 tons.

There was a net gain of 14 furnaces in December, 15 having been blown in and one shut down. The net gain in November was also 14. The number active on Jan. 1 was 234 with an estimated daily capacity of 107,560 tons. This compares with an estimated capacity of 103,445 tons per day for the 220 furnaces active on Dec. 1. Of the 15 furnaces blown in, 4 were Steel Corporation stacks, 5 were independent company furnaces and 6 were merchant. The one furnace shut down belonged to an independent steel company.

The ferromanganese output in December of 26,072 tons was the largest for the year as was also the spiegeleisen production of 7756 tons.

The list of possible active coke furnaces in the United States is now 378, the following having been

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchants*	Total
December, 1924	76,682	18,857	95,539
January, 1925	86,856	21,864	108,720
February	90,707	24,084	114,791
March	90,741	24,234	114,975
April	83,827	24,805	108,632
May	74,415	20,127	94,542
June	70,452	18,663	89,115
July	65,715	20,221	85,936
August	68,530	18,711	87,241
September	70,300	20,573	90,873
October	76,464	21,064	97,528
November	77,262	23,505	100,767
December	81,552	23,301	104,853

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	Dec. (31 days)	Nov. (30 days)	Oct. (31 days)	Sept. (30 days)
New York	194,091	176,700	176,437	148,787
New Jersey	.....	.....	.....	.....
Lehigh Valley	83,016	83,180	87,433	77,590
Schuylkill Valley	71,288	65,388	67,077	69,129
Lower Susquehanna and Lebanon Valleys	40,086	39,187	39,157	29,339
Pittsburgh district	765,844	638,689	633,685	552,496
Shenango Valley	130,919	124,527	120,705	91,009
Western Pa.	115,105	109,276	102,214	87,217
Maryland, Virginia and Kentucky	79,209	74,500	97,656	79,194
Wheeling district	121,065	116,880	128,103	125,199
Mahoning Valley	278,935	271,885	294,613	269,439
Central and Northern Ohio	324,229	316,956	335,147	319,374
Southern Ohio	44,604	48,756	39,864	32,350
Illinois and Indiana	580,473	570,721	548,400	507,219
Mich., Minn., Mo., Wis., Colo. and Utah	151,398	138,017	128,804	117,230
Alabama	257,705	237,285	216,550	215,597
Tennessee	12,481	11,059	7,525	5,029
Total	3,250,448	3,023,006	3,023,370	2,726,198

Coke and Anthracite Furnaces in Blast

Furnaces	Total Stacks	Jan. 1 — In Blast	Jan. 1 — Capacity per Day	Dec. 1 — In Blast	Dec. 1 — Capacity per Day
New York:					
Buffalo	21	15	6,545	12	5,595
Other New York	4	2	600	1	305
New Jersey	4	0	....	0	....
Pennsylvania:					
Lehigh Valley	12	6	2,400	6	2,555
Spiegeleisen	2	2	250	2	320
Schuylkill Valley	15	6	2,300	6	2,175
Lower Susquehanna	8	3	1,145	3	1,395
Ferromanganese	1	1	65	1	65
Lebanon Valley	4	1	165	0	....
Ferromanganese	2	1	85	1	85
Pittsburgh District	52	46	25,080	42	23,050
Ferro and Spiegel	4	2	305	3	460
Shenango Valley	15	9	3,950	8	4,145
Western Pa.	19	7	3,405	8	3,600
Ferro and Spiegel	2	2	300	1	160
Maryland	5	5	2,085	5	1,935
Ferromanganese	1	0	....	0	....
Wheeling District	13	8	3,905	8	3,685
Ohio:					
Mahoning Valley	26	17	9,095	16	8,990
Central and Northern	22	20	10,910	18	10,200
Southern	13	5	1,375	5	1,625
Illinois and Indiana	42	32	19,200	31	19,020
Mich., Wis. and Minn.	12	8	3,200	8	3,075
Colo., Mo. and Utah	7	4	1,680	4	1,695
The South:					
Virginia	16	1	135	1	140
Ferromanganese	1	0	....	0	....
Kentucky	7	2	670	1	345
Alabama	35	25	8,235	25	8,380
Ferromanganese	1	1	75	1	80
Tennessee	12	3	400	3	365
Total	378	234	107,560	220	103,445

Production of Steel Companies for Own Use—Gross Tons

	Total Iron, Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
			1924		1925	
	1924	1925	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	2,274,005	2,692,537	20,735	7,948	23,578	5,418
Feb.	2,410,658	2,539,785	22,405	9,870	18,184	4,910
Mar.	2,674,565	2,812,995	22,351	13,796	20,062	5,449
Apr.	2,463,027	2,514,828	23,580	4,240	21,448	5,341
May	1,927,461	2,306,887	14,993	9,336	22,679	5,294
June	1,507,110	2,113,566	20,049	9,405	19,836	4,972
½ year	13,256,826	14,980,598	124,113	54,595	125,787	31,384
July	1,343,952	2,037,160	14,367	15,328	16,614	5,074
Aug.	1,413,314	2,124,439	10,718	8,010	18,867	4,939
Sept.	1,509,360	2,109,205	13,263	5,033	18,381	5,162
Oct.	1,858,502	2,370,382	7,780	10,047	21,421	5,071
Nov.	1,896,886	2,317,888	13,448	8,835	25,490	6,375
Dec.	2,377,141	2,528,120	21,220	5,284	26,072	7,756
Year	23,656,981	28,467,792	204,909	107,132	252,632	65,761

*Includes output of merchant furnaces.

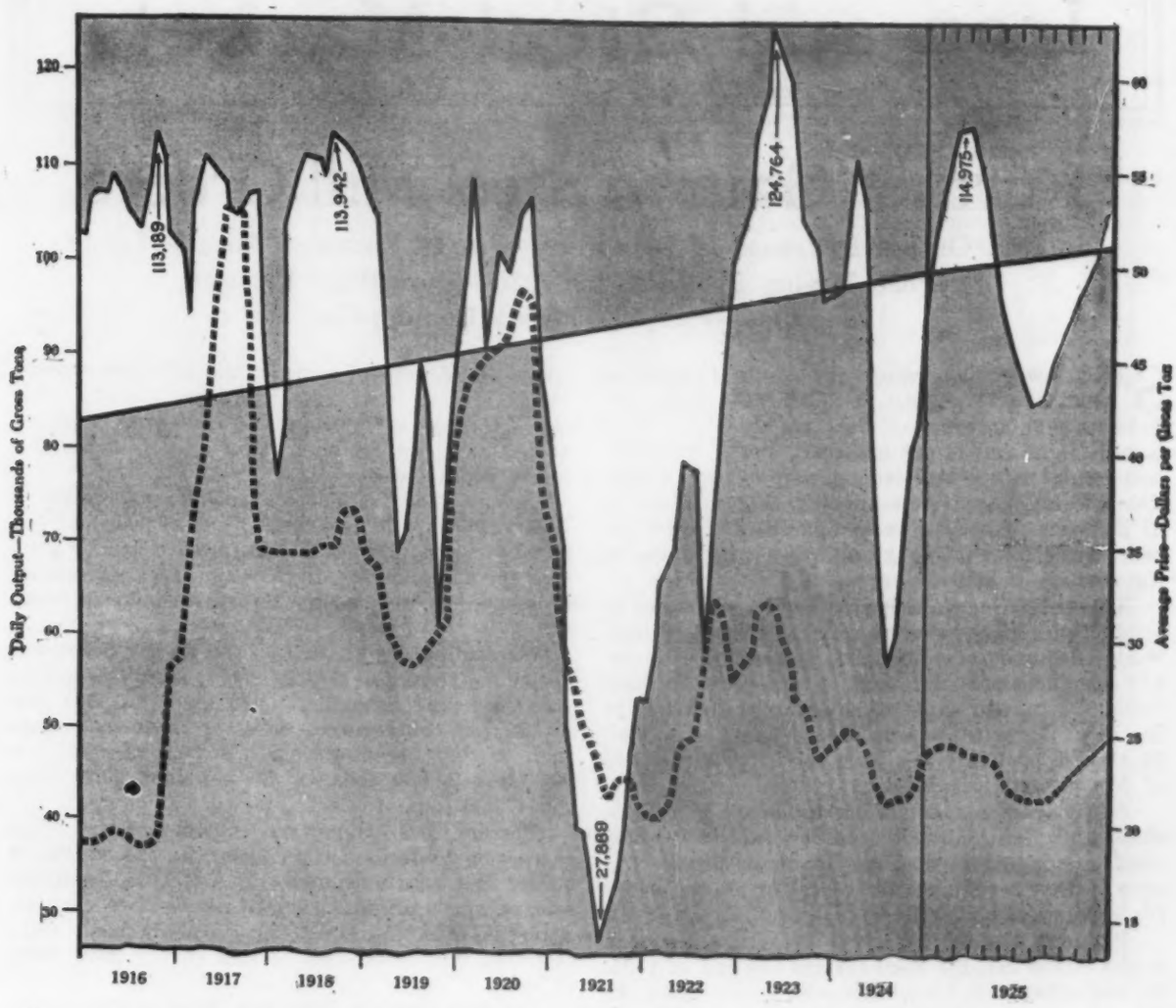
Production of Coke and Anthracite Pig Iron in United States by Months, Beginning Jan. 1, 1923—Gross Tons

	1923	1924	1925
Jan.	3,229,604	3,018,890	3,370,336
Feb.	2,994,187	3,074,757	3,214,143
Mar.	3,523,868	3,466,086	3,564,247
Apr.	3,549,736	3,233,428	3,258,958
May	3,867,694	2,615,110	2,930,807
June	3,676,445	2,026,221	2,673,457
½ year	20,841,534	17,434,492	19,011,948
July	3,678,334	1,784,899	2,664,024
Aug.	3,449,493	1,887,145	2,704,476
Sept.	3,125,512	2,053,264	2,726,198
Oct.	3,149,158	2,477,127	3,023,370
Nov.	2,894,295	2,509,673	3,023,006
Dec.	2,920,982	2,961,702	3,250,448
Year*	40,059,308	31,108,302	36,403,470

*These totals do not include charcoal pig iron. The 1924 production of this iron was 212,710 tons.

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1921—Gross Tons

	1921	1922	1923	1924	1925
Jan.	77,945	53,063	104,181	97,384	108,720
Feb.	69,187	58,214	106,935	106,026	114,791
Mar.	51,468	65,675	113,673	111,809	114,975
Apr.	39,768	69,070	118,324	107,781	108,632
May	39,394	74,409	124,764	84,358	94,542
June	35,494	78,701	122,548	67,541	89,115
½ year	52,089	66,578	115,147	95,794	105,039
July	27,889	77,592	118,656	57,577	85,936
Aug.	30,780	58,586	111,274	60,875	87,241
Sept.	32,850	67,791	104,184	68,442	90,873
Oct.	40,215	85,092	101,586	79,907	97,528
Nov.	47,183	94,990	96,476	83,656	100,767
Dec.	53,196	99,577	94,225	95,539	104,853
Year	45,325	73,645	109,713	85,075	99,831



Daily Output in December About 4 Per Cent More than in November; Prices Again Higher

Inclined line represents the gradually increasing theoretical needs of the country, and thus shows production in recent months less than the so-called normal. Dotted line represents the average price in dollars per gross ton of No. 2 Southern at Cincinnati, No. 2 at Chicago and No. 2X at Philadelphia

dismantled or regarded as defunct: Burden furnace in New York; Steubenville of the Steel Corporation at Steubenville Ohio; Niles furnace of the Steel Corporation in Ohio and the Hannah furnace of the Republic Iron & Steel Co at Youngstown.

The 1925 total for coke pig iron was 36,403,470 tons; the corresponding total for 1924 was 31,108,302 tons and that for 1923 was 40,059,308 tons. Last year's output was therefore slightly in excess of the average for 1923 and 1924.

Among the furnaces blown in during December were the following: Two furnaces of the Lackawanna plant of the Bethlehem Steel Corporation and one Susquehanna furnace of the Rogers-Brown Iron Co. in the Buffalo district, and No. 2 Northern furnace in New York; the Mary furnace of the Thomas Iron Co. in the Lehigh Valley; the Robesonia furnace in the Lebanon Valley; one Carrie and one Isabella furnace of the Carnegie Steel Co. and the Clifton furnace in the Pittsburgh district; one Newcastle furnace of the Carnegie Steel Co. in the Shenango Valley; one Ashland furnace of the American Rolling Mill Co. in Kentucky; the Grace furnace of the Youngstown Sheet & Tube Co. in the Mahoning Valley; one Otis furnace and one River furnace in northern Ohio; one Gary furnace in the Chicago district.

There was only one furnace blown out or banked during December: A furnace at the Bethlehem plant of the Bethlehem Steel Corporation in the Lehigh Valley.

Weirton Steel Co. Starts Extension Program

The Weirton Steel Co., Weirton, W. Va., has started on its program of plant extensions, which will probably mean total expenditures of around $15,000,000. The company has just placed the contract with the Koppers Co., Pittsburgh, for 49 additional Koppers-Becker ovens, together with the necessary equipment to take care of the increased output of by-products. The new ovens are expected to be completed in about eight months and the company then will have a total of 86 ovens, capable of carbonizing about 2500 tons of coal per day, with a yield of between 1600 and 1700 tons of coke.

The company has also placed 3600 tons of structural steel with the American Bridge Co., to house the four additional open hearth furnaces which are to be built, and it is expected that in another week there will be announcement of the company's plans as to its new 800-ton blast furnace, as well as the extension to the sheet mill plant. Building of the new tube mill will be taken up after these several additions are under way.

The Union Electric Steel Corporation, Carnegie, Pa., maker of forgings and specializing in die blocks, trimmer steels, bit and jar steels and tin mill rolls, is doubling its heat treating capacity and on Jan. 4 started running the plant on double turn.

Iron and Steel Markets

Further Gain in Steel Mill Orders

Pig Iron Output Increased in December, with 14 Furnaces Added—Large Railroad Buying Promised for 1926—More Blast Furnace and Open-Hearth Capacity Coming On

STEEL works operation in the first week of 1926 is only slightly less than the high pre-holiday rate, in spite of the fact that new business is light and is not expected on any considerable scale before the second half of the month. The Steel Corporation's current rate is close to 87 per cent. Youngstown companies are at 90 per cent, while for Pittsburgh and adjoining districts the average is still 80 per cent.

The prevailing view is that the maintenance of production on the present scale will meet all mid-winter demands of consuming industries. December specifications and new orders were in such volume as would cause a substantial increase in the Steel Corporation's unfilled orders, as of Dec. 31, though probably less than the 473,000-ton gain of November.

Apart from an advancing tendency in billets, slabs and sheet bars, due to the fact that some steel companies have little of their product to offer in that form, the outlook is for stable prices for some weeks ahead.

Pig iron production shows a further response to the larger call for steel toward the end of 1925. In December the blast furnaces made 3,250,448 tons of iron, or 104,853 tons a day, as compared with a November output of 3,023,006 tons, or 100,767 tons a day.

More furnaces are wheeling into line, the active list showing a net gain in December of 14. The 234 furnaces in blast Jan. 1 had a total capacity of 107,560 tons a day, against 103,445 tons a day for 220 furnaces on Dec. 1. Thus production is now at a rate not equaled since last April.

We estimate the country's steel ingot output in 1925 at 44,000,000 tons, and that of steel castings at 1,250,000 tons, making a total of 45,250,000 tons. The high record was 45,060,607 tons (43,619,200 tons of ingots and 1,441,407 tons of castings) in 1917.

Pig iron production in 1925 (estimating charcoal iron at 200,000 tons) was about 36,750,000 tons. There were five greater years and the record of 40,361,146 tons was made in 1923.

Additions to the country's steel making capacity in 1925 consisted of 10 furnaces capable of producing 585,000 tons a year. In the six previous post-war years the average addition was 504,000 tons a year. Fourteen open-hearth furnaces now under construction and likely to be finished in 1926 represent a capacity of 955,000 tons a year.

Only one new blast furnace was completed in the country in 1925. However, nine furnaces are now under construction, representing an annual capacity of 1,875,000 tons. On the other hand, 24 blast furnaces, most of them of smaller caliber, have been abandoned or scrapped in the past year.

Current railroad buying includes nearly 40,000 tons of plates, shapes and bars for the Pennsylvania, 10,000 tons of rails for the Missouri-Kansas-Texas system and several orders covering 1575 cars. Chicago mills count on 75,000 tons of plates, shapes and bars for other car contracts looked for in the coming week.

Seeing that the new railroad cars ordered in 1925 were only 77 per cent of the average for the past ten years, 1926 is looked forward to as a good year for car builders. In rails and track accessories it is expected to yield the largest tonnage in many years.

Expanding use of steel on the Pacific Coast was shown by lettings of 270,000 tons of structural steel last year against 170,000 tons in 1924; also 52,000 tons of concrete bars, or 5000 tons more than in the preceding year. Buying of cast iron pipe was 70,000 tons, or 50 per cent more than the 47,000 tons of 1924.

Pacific Coast importers continue active with concessions offered in pig iron in the effort to secure first quarter contracts. A German company sold at much below American prices 1500 tons of seamless pipe for penstocks. An Oakland, Cal., shipyard will build two ferries taking 2400 tons of steel.

Pig iron imports into New England last year, estimated at 125,000 tons, made a distinct cut into the normal business there and a further realinement is looked for this year when the Troy, N. Y., and Everett, Mass., blast furnaces are put into blast. Total pig iron imports last year were about 420,000 tons.

Pittsburgh

Inventory-Taking Restricts New Business but Steel Outlook Is Favorable

PITTSBURGH, Jan. 5.—New business in steel is light, but this is a natural condition when inventories still are engaging the attention of the consumers. It is not disturbing to manufacturers, especially as they are well provided with specifications against this month's production. It is believed that by the latter part of the month any paucity of demand that now exists will have disappeared. There are no signs of any recession in the activities of consuming industries outside of that occasioned by inventory-taking, and it is expected that pipe and wire products, which have been rather dull lately, will provide considerable tonnage in the next 60 or 90 days. Already there are reports of improved demand for oil country pipe and there has been a substantial increase in the shipments of wire products with the passing of the date on which shipments would have to be figured in inventories.

Prices are holding firm all along the line, but signs of early or material advances are lacking and for that reason buyers feel safe in keeping their specifications within a comparatively short range. As the railroads are enjoying exceptionally good earnings they are counted on to spend considerable this year for rolling

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 5, 1926	Dec. 28, 1925	Dec. 8, 1925	Jan. 6, 1925
No. 2X, Philadelphia‡	$24.26	$24.26	$24.26	$25.01
No. 2, Valley Furnace†	20.50	20.50	20.50	22.00
No. 2, Southern, Cin'ti†	25.69	25.69	25.69	24.05
No. 2, Birmingham, Ala.†	22.00	22.00	22.00	20.00
No. 2 foundry, Ch'go furn.*	23.00	23.00	23.00	24.00
Basic, del'd, eastern Pa.	23.00	23.00	23.00	24.25
Basic, Valley furnace	20.00	20.00	20.00	21.50
Valley Bessemer del. P'gh.	22.76	22.76	22.76	24.26
Malleable, Chicago, furn.*	23.00	23.00	23.00	24.00
Malleable, Valley	20.50	20.50	20.50	22.00
Gray forge, Pittsburgh	21.76	21.76	21.76	23.26
L. S. charcoal, Chicago	29.04	29.04	29.04	29.04
Ferromanganese, furnace	115.00	115.00	115.00	110.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	**36.00**	35.00	35.00	37.00
O.-h. billets, Pittsburgh	**36.00**	35.00	35.00	38.00
O.-h. sheet bars, P'gh.	**37.00**	36.00	36.00	39.00
Forging billets, base, P'gh.	40.00	40.00	40.00	42.50
O.-h. billets, Phila.	41.30	41.30	40.30	41.67
Wire rods, Pittsburgh	45.00	45.00	45.00	48.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.90	1.90	1.90	2.00
Light rails at mill	1.65	1.65	1.65	1.80
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.22	2.22	2.22	2.10
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	2.00	2.00	2.00	2.10
Steel bars, Chicago	2.10	2.10	2.10	2.10
Steel bars, New York	2.34	2.34	2.34	2.44
Tank plates, Pittsburgh	1.90	1.90	1.90	2.00
Tank plates, Chicago	2.10	2.10	2.10	2.20
Tank plates, New York	2.09	2.09	2.04	2.34
Beams, Pittsburgh	1.90	1.90	1.90	2.10
Beams, Chicago	2.10	2.10	2.10	2.20
Beams, New York	2.24	2.24	2.24	2.34
Steel hoops, Pittsburgh	2.50	2.50	2.50	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Jan. 5, 1926	Dec. 28, 1925	Dec. 8, 1925	Jan. 6, 1925
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.35	3.35	3.35	3.60
Sheets, black, No. 28, Chicago dist. mill	3.45	3.45	3.45	3.70
Sheets, galv., No. 28, P'gh.	4.60	4.60	4.60	4.75
Sheets, galv. No. 28, Chicago dist. mill	4.70	4.70	4.70	4.85
Sheets, blue, 9 & 10 P'gh.	2.50	2.50	2.50	2.70
Sheets, blue, 9 & 10, Chicago dist. mill	2.60	2.60	2.60	2.80
Wire nails, Pittsburgh	2.65	2.65	2.65	2.85
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.95
Plain wire, Pittsburgh	2.50	2.50	2.50	2.60
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.70
Barbed wire, galv., P'gh.	3.35	3.35	3.35	3.55
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.65
Tin plate, 100 lb. box, P'gh.	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	$18.00	$18.00	$18.50	$22.00
Carwheels, Philadelphia	18.50	18.50	18.50	19.50
Heavy steel scrap, P'gh.	19.00	19.00	19.00	22.00
Heavy steel scrap, Phila.	17.50	17.50	17.50	20.00
Heavy steel scrap, Ch'go.	15.25	15.25	15.75	19.75
No. 1 cast, Pittsburgh	17.50	17.50	18.00	19.50
No. 1 cast, Philadelphia	18.50	18.50	18.00	20.50
No. 1 cast, Ch'go (net ton)	17.00	17.00	17.25	20.50
No. 1 RR. wrot. Phila.	18.50	18.50	18.50	21.00
No. 1 RR. wrot. Ch'go (net)	13.50	13.50	14.00	17.75
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	*$4.75*	$5.50	$3.50	$4.15
Foundry coke, prompt	5.50	5.50	4.75	5.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.25	14.25	14.25	15.25
Electrolytic copper, refinery	13.87½	13.87½	13.87½	14.87½
Zinc, St. Louis	**8.67½**	8.62½	8.75	7.85
Zinc, New York	**9.02½**	8.97½	9.00	8.20
Lead, St. Louis	9.00	9.00	9.00	10.00
Lead, New York	9.25	9.25	9.25	10.25
Tin (Straits), New York	*63.25*	63.37½	63.50	59.87½
Antimony (Asiatic), N. Y.	**25.00**	22.25	20.25	18.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

THE IRON AGE Composite Prices

Finished Steel

Jan. 5, 1926, 2.453c. Per Lb.

One week ago	2.453c.
One month ago	2.453c.
One year ago	2.560c.
10-year pre-war average	1.689c.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.

	High		Low	
1925	2.560c.,	Jan. 6	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15	2.460c.,	Oct. 14
1923	2.824c.,	April 24	2.446c.,	Jan. 2

Pig Iron

Jan. 5, 1926, $21.54 Per Gross Ton

One week ago	$21.54
One month ago	21.54
One year ago	22.25
10-year pre-war average	15.72

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.

	High		Low	
1925	$22.50,	Jan. 13	$18.96,	July 7
1924	22.88,	Feb. 26	19.21,	Nov. 3
1923	30.86,	March 20	20.77,	Nov. 20

stock, bridges and terminals, and the plans of the automotive industry for 1926 call for a production about 25 per cent greater than in the past year. The new year begins with some good-sized structural lettings, and altogether there seems to be ample warrant for the belief in continued good business over the first half of the year. There is not complete satisfaction with present prices of all steel products, but at the same time there is no tendency on the part of the manufacturers to force them beyond levels at which sales can be readily made. In contrast with the condition of a year ago, the aim of manufacturers is to keep business coming in steadily and to secure profits through cost reductions rather than in price advances.

The Youngstown district is producing ingots this week at about 90 per cent of capacity, but the average of the entire greater Pittsburgh district is not far from 80 per cent, which has been the average for the past few weeks. The Carnegie Steel Co. has put on its one idle furnace of its Carrie group at Rankin, Pa., and the furnace of the Struthers Furnace Co., Struthers, Ohio, which is being operated by a receiver is to blow in tomorrow. Of the 130 furnaces in this and nearby districts 92 will be in production by the end of the week.

Activity still is lacking in the pig iron market, but prices are holding. The failure of expected demands to materialize has not affected scrap prices. Furnace coke for prompt delivery is somewhat lower than it was a week ago, but the market is fairly firm, since

there is still a fair demand for crushed coke to replace hard coal and producers are not accumulating much beyond those requirements and the tonnages already sold on first quarter contracts.

Pig Iron.—Large uses of pig iron appear to be amply covered against their immediate requirements and interest in the market is confined to small consumers who rarely buy very far ahead of their needs. There is a steady demand for small tonnages of foundry iron and makers are having no trouble in obtaining full quotations in such lots. A local maker of railroad car castings has bought 750 tons of Bessemer iron for February and March shipment at $21, Valley furnace, and several small lots also have been moved at the same price. There is almost no demand for basic iron. W. P. Snyder & Co. make the average prices of basic and Bessemer iron from Valley furnaces in December, based on sales of 1000-ton lots, $20 and $21, respectively. November averages were $19.82 and $20.88. For the year the averages were $19.50 and $20.56, against $20.25 and $21.52 in 1924. THE IRON AGE averages for the year were $19.44 for basic and $20.57 for Bessemer, f.o.b. Valley furnaces.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$20.00
Bessemer	21.00
Gray forge	20.00
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	20.50
Low phosphorus, copper free	$28.00 to 28.50

Ferroalloys.—In the absence of signs of an early advance in ferromanganese consumers feel safe in covering only their immediate requirements. On such business as is being done there are no deviations from $115, Atlantic seaboard, on either domestic or foreign 80 per cent material. Specifications against contracts for spiegeleisen and high grade ferrosilicon are fairly good, but new business is light. Prices are given on page 83.

Semi-Finished Steel.—High prices reported from northern Ohio on billets, slabs and sheet bars do not seem to be helping mills in this and nearby districts to higher levels. These producers appear to have fully covered the requirements of their regular customers for this quarter at $35, Pittsburgh or Youngstown, for large billets and slabs, and $36 for sheet bars and small billets and slabs. They are not certain at the moment that they will have any more steel to sell for the period after making allowance for requirements of contract buyers and their own needs. Consequently, asking prices are $1 a ton above contract quotations, but no business of importance has been done at the higher figures. A recent sale of wide slabs at $38, Pittsburgh, now appears to have been a bargain, since other producers quoted from $39 to $43, because of the exacting specifications. There has been no business of consequence in wire rods at more than $45, base Pittsburgh or Cleveland. Pipe makers can get plenty of skelp at 1.90c. Prices are given on page 83.

Steel and Iron Bars.—The price range on steel bars is still 2c. to 2.10c., base Pittsburgh. The higher is insisted on only for very small tonnages or for orders that are unattractive because they embrace many different sizes. The inventory period is keeping down new business, but most mills are provided with sufficient specifications to keep them well engaged through this month. Many consumers late last month sent in shipping instructions against unspecified fourth quarter tonnages. Iron bars are steady at recent prices. Prices are given on page 81.

Structural Steel.—All mills have a quotation of 2c. base Pittsburgh, on large structural shapes, but actually no tonnages of consequence have been placed at higher than 1.90c. Fabricating shops in this district are beginning the new year with fair-sized order books and specifications for plain material are steady. Two new jobs provide the American Bridge Co. with approximately 4800 tons. A new 1200-room hotel to be known as the Pittsburgh-Pennsylvania, is to be built on a plot created by street changes near the Pennsylvania Railroad Station, but the steel requirements are not yet known. Prices are given on page 81.

Plates.—The market in the territory where local mills have an advantage in freight over outside mills remains at 1.90c. With local railroad car building companies fairly well supplied with orders, mills are not obliged to go so far afield as usual to secure business. Specifications from car plants are engaging considerable local plate capacity. It is believed this will be a good year in railroad car orders, in view of excellent earnings by the railroads in 1925. Prices are given on page 81.

Rails and Track Supplies.—Makers of light rails rolled from billets are quoting $36 to $37 per gross ton, mill, and report sales at both prices, despite the fact that rail steel rails are offered $2 a ton lower. Demand is steady rather than active. There is some stiffening in track bolts, with $4, base, per 100 lb. now the more common price. Prices are given on page 81.

Tubular Goods.—Despite a reported increase in specifications for oil country pipe, and somewhat freer takings of standard pipe, the market cannot be described as active. The oil situation is improving and pipe makers look for an increase in demand as spring approaches. Prices are steady. There continues to be room for improvement in prices on boiler tubes. Discounts are given on page 81.

Sheets.—New business is slow in all finishes of sheets and is expected to remain so until after the completion of inventories. Mill operations are high, however, as there was considerable specifying in December against tonnages carrying lower prices than now prevail. It will be recalled that November orders were the largest of any month in the history of sheet making and the advance to present levels came after, rather than during, this rush of buying. Car builders are specifying fairly freely on tonnage placed about the time car orders began to come in. Prices are given on page 81.

Tin Plate.—The action of the leading maker of cans in making substantial price reductions is not expected to have any effect upon tin plate prices. Evidently there was a wide margin of profit in cans in 1925, because there was considerable price cutting. Tin plate makers are well supplied with first half business from contract customers and continue to operate at a high rate for the time of year.

Cold Finished Steel Bars and Shafting.—Makers are fairly busy on late December specifications against unshipped tonnages. New business is rather light, because of inventories, but if present production plans of the automobile makers do not miscarry, a very material quickening in demand will develop in the last half of the month. The price remains firm at 2.50c., base Pittsburgh, for the ordinary tonnages.

Hot Rolled Flats.—December bookings of makers in this and nearby districts were sufficiently large to insure good mill operations this month, and while current demands are small on account of inventory taking, there is no anxiety about business nor any weakening in prices. They are given on page 81.

Cold Rolled Strips.—New business is light, but makers appear to be well supplied with orders calling for shipment this month. Prices are firm.

Wire Products.—The turn of the new year has brought the release of some good-sized shipments against contracts. Neither jobbers nor manufacturing consumers were recently disposed to take deliveries that would show in their inventories. The best movement continues in plain wire, but demands for nails indicate that most jobbers entered the new year with light stocks. The general feeling among producers is that some items, notably nails and woven wire fence, are priced too low, but jobbers have been covered against their requirements for the next 60 days and manufacturing consumers for the entire quarter at present prices. Some of the smaller makers of coated nails are quoting $2 base per count keg, but are not faring well in current business, because the larger producers continue at $1.85. The basis for the higher quotation is that on the base sizes the net return is not

Prices of Finished Iron and Steel Products (Carload Lots)

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. P'gh mills	2.00c. to 2.10c.
F.o.b. Chicago	2.10c.
Del'd Philadelphia	2.32c. to 2.42c.
Del'd New York	2.34c. to 2.44c.
Del'd Cleveland	2.19c.
F.o.b. Birmingham	2.15c. to 2.25c.
C.i.f. Pacific ports	2.30c. to 2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	2.00c. to 2.10c.

Rail Steel

F.o.b. mill	1.80c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	3.00c.
Common iron, del'd Phila'phia	2.22c.
Common iron, del'd New York	2.24c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mill	1.90c. to 2.00c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	1.99c. to 2.09c.
Del'd Philadelphia	2.07c. to 2.12c.
Del'd New York	2.09c. to 2.14c.
C.i.f. Pacific ports	2.30c. to 2.35c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mill	1.90c. to 2.10c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.22c. to 2.32c.
Del'd New York	2.24c. to 2.34c.
C.i.f. Pacific ports	2.35c. to 2.40c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.50c.
All gages, 6 in. and wider, P'gh	2.30c.
All gages, 6 in. and narrower, Chicago	2.60c.
All gages, wider than 6 in., Chicago	2.50c.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. P'gh mills	2.50c.
Bars, f.o.b. Chicago	2.50c.
Bars, Cleveland	2.55c.
Shafting, ground, f.o.b. mill	*2.70c. to 3.00c.
Strips, f.o.b. P'gh mills	3.90c.
Strips, f.o.b. Cleveland mills	3.90c.
Strips, delivered Chicago	4.20c.
Strips, f.o.b. Worcester mills	4.05c.

*According to size.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galv'd nails, 1-in. and longer	4.65
Galv'd nails, shorter than 1 in.	4.90
Galv'd staples	3.35
Polished staples	3.10
Cement coated nails, base, per count keg	1.85

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant, and Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.50c.
Nos. 9 and 10, f.o.b. Ch'go dist. mills	2.60c.
Nos. 9 and 10, del'd Phila'phia	2.72c. to 2.82c.

Box Annealed, One Pass Cold Rolled

No. 28, f.o.b. Pittsburgh	3.35c.
No. 28, f.o.b. Ch'go dist. mill	3.45c.
No. 28, del'd Phila'phia	3.57c. to 3.67c.

Galvanized

No. 28, f.o.b. Pittsburgh	4.60c.
No. 28, f.o.b. Chicago dist. mill	4.70c.
No. 28, del'd Phila'phia	4.82c. to 4.92c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.35c.
No. 28, f.o.b. Chicago dist. mill	3.45c.

Automobile Body Sheets

No. 22, f.o.b. Pittsburgh	4.50c.

Long Ternes

No. 28, 8-lb. coating, f.o.b. mill	4.85c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.40
8-lb. coating I.C.	11.70
15-lb. coating I.C.	14.85
20-lb. coating I.C.	$16.20
25-lb. coating I.C.	17.90
30-lb. coating I.C.	19.45
40-lb. coating I.C.	21.65

Alloy Steel Bars

(F.o.b. Pittsburgh or Chicago)

S. A. E. Series Numbers		Base Per 100 Lb.
2100*	(1½% Nickel, 0.10% to 0.20% Carbon)	$3.25 to $3.30
2300	(3½% Nickel)	4.60 to 4.70
2500	(5% Nickel)	5.80 to 5.90
3100	(Nickel Chromium)	3.60 to 3.70
3200	(Nickel Chromium)	5.25 to 5.35
3300	(Nickel Chromium)	7.25 to 7.35
3400	(Nickel Chromium)	6.50 to 6.60
5100	(Chromium Steel)	3.60
5200*	(Chromium Steel)	7.50 to 8.25
6100	(Chrom. Vanadium bars)	4.30 to 4.40
6100	(Chrom. Vanad. spring steel)	3.85
9250	(Silicon Manganese spring steel)	3.25 to 3.30
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.20 to 4.45
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.55 to 4.65
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.35 to 4.45
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.50 to 3.60
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molyb.)	4.75 to 5.00

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2¼-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specifications, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	$36.00 to 37.00
Light (from rail steel), f.o.b. mill	34.00 to 35.00

	Base Per Lb.
Light (from billets), f.o.b. Ch'go mill,	1.80c. to

Track Equipment

(F.o.b. Mill)

	Base Per 100 Lb.
Spikes, ⅝ in. and larger	$2.80 to $3.10
Spikes, ½ in. and smaller	3.00 to 3.50
Spikes, boat and barge	3.25
Track bolts, all sizes	3.90 to 4.25
Tie plates, steel	2.35 to 2.50
Angle bars	2.75

Welded Pipe

Base Discounts f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	1
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	45½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+11	+54
½	53	42½	½	21	7
¾	55	47½	¾	28	13
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased (on black) by one point, with supplementary discount of 5% and (on galvanized) by 1½ point, with supplementary discount of 5%. On iron pipe, both black and galvanized, the preferentials to large jobbers are 1, 5 and 2½% beyond the above discount.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 5 to 7 fives extra are given on lap welded steel tubes and 2 to 3 tens on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	34	3¼ and 3½ in.	50
2½ and 2¾ in.	42	4 in.	53
3 in.	48	4½, 5 and 6 in.	45

Less carloads, 4 points less. Add $2 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Mixed smaller sizes 4 in. and lighter than standard gage to [illegible] chanical tube list and discounts.....80 and 10

sizes and gages not listed.....

larger outside diameter.....

Set screws, case hardened.....80

Set screws, cut thread.....80

Seamless steel head cap screws, U. S. S. thread, 80, 10 and 10

Upset hex. cap screws, S. A. E. thread, 80 and 10

Upset set screws....80, 10 and 10 to 80, 10 and 25

Milled studs .....70 and 5

equal to that on bright nails. Prices are given on page 81.

Bolts, Nuts and Rivets.—Demand for bolts and nuts seems to be expanding steadily and prices are holding well. Sales of large rivets still are noted at less than $2.60 base per 100 lb., Pittsburgh, but that price is the common one on ordinary lots, concessions usually coming out where the orders run to a few sizes or where the size extras are large. Railroad car builders are buying more heavily than before in some time. Prices and discounts are given on page 81.

Coke and Coal.—Furnace coke prices have eased off somewhat in the week, the market for spot tonnages now being quotable from $4.75 to $5.75 against $4.50 to $5.75 a week ago. Offerings of standard furnace coke are not at all heavy. There continues to be a rather good market East for crushed coke, and as a settlement of the hard coal strike is yet to be effected, Connellsville operators are disposed to crush the surplus over their contract requirements. Yard crushed 48-hr. coke is commanding as much as $7 a net ton, and coke prepared in regular crushing machinery is selling as high as $8, at Connellsville ovens. The cost of crushing is only a matter of 75c. to $1 a ton and the prices ruling for the prepared sizes are remunerative. There is not much tendency to increase production of 72-hr. coke because of the more profitable market in domestic sizes. There is a fair market for gas and coking grades of coal, but on steam coal the market is as depressed as it has been at any time in the past two years, as there is over production and prices are low and unprofitable. Prices are given on page 83.

Old Material.—Outside of a purchase by an Ohio River steel maker of between 5000 and 10,000 tons of heavy melting steel at prices ranging from $19.25 to $19.50, the week has been lacking in interesting developments. Dealers hope that after inventories are out of the way steel makers will want considerable scrap, but there are no strong signs that the mills will immediately enter the market. Seemingly, with every effort on the part of dealers to advance prices, distress material appears and prospective buyers are prompted to delay. Offerings of scrap are light, chiefly because what is in the hands of dealers was bought at high prices and cannot be sold profitably at today's levels. This does not mean that there is a shortage of scrap; actually, supplies are larger than those interested in higher prices wish they were. There is no occasion to change prices, which on most grades have remained stationary for three weeks.

We quote for delivery to consumer's mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$19.00 to $19.50
No. 1 cast, cupola size	17.50 to 18.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	20.50 to 21.50
Compressed sheet steel	18.00
Bundled sheets, sides and ends	17.00
Railroad knuckles and couplers	21.50 to 22.00
Railroad coil and leaf springs	21.50 to 22.00
Low phosphorus blooms and billet ends	24.00 to 24.50
Low phosphorus plates and other material	23.00 to 23.50
Low phosphorus punchings	21.00 to 21.50
Railroad malleable	19.50 to 20.00
Steel car axles	23.00 to 23.50
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	22.00 to 22.50
Machine shop turnings	14.00 to 14.50
Short shoveling turnings	15.00 to 15.50
Sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	17.00 to 17.50
Short mixed borings and turnings	15.00 to 15.50
Heavy breakable cast	17.00 to 17.50
Stove plate	14.50 to 15.00
Cast iron borings	15.00 to 15.50
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	19.00 to 19.50

base Pitt

ly no tonnage due Jan. 1 on $623,000 outstanding 8 per higher than 1.9be Falcon Sheet & Tin Plate Co., opare beginning the new ye. at Canton, Ohio, and owned and specifications for plain nantified with the Falcon new jobs provide the American aid, according to the proximately 4800 tons. A new 120 The company has known as the Pittsburgh-Pennsylvania st on the bonds, on a plot created by street changes near

Chicago

Twenty Per Cent Gain in Steel Sales in 1925—Heavy Pending Car Business

CHICAGO, Jan. 5.—Figures now available show that sales of finished steel products in the Chicago district for 1925 were 20 per cent above those for 1924 and that orders passed to entry at the mills were between 20 and 25 per cent heavier than in the preceding 12 months. This gain was made in spite of the fact that orders for railroad rolling stock in 1925 were only slightly over half the number of cars placed in 1924. Freight cars placed during the past year were only 77 per cent of the average for the past 10 years.

Prices are generally steady and unchanged, and producers' obligations are practically all liquid, being largely in the form of specifications. Sales are reported as being distributed fairly evenly over a wide variety of products. New business for December exceeded that of November by a small percentage. The week just closed was the best seven-day period of the year from the viewpoint of new bookings.

Soft steel bar business is unusually heavy and mills have had the best week since last February in contracts and specifications for structural material. Of the heavier finished products plates are in the least demand, although the trade anticipates that recent car awards, combined with new inquiries for both railroad cars and tankage, will put this commodity more in line with bars and shapes. An inquiry issued this week calls for 5000 tons of plates for oil storage tanks.

The new year opens with 10,000 to 11,000 freight cars on inquiry by Western railroads. Their placing will add to producers' books over 100,000 tons of plates, shapes and bars. Another 50,000 to 60,000 tons will be required for cars for which inquiries are now being prepared by two major railroads with terminals at Chicago.

Steel mill operations remain unchanged. The leading interest is at 88 per cent of ingot capacity and is blowing 17 stacks. Ten stacks are active at Gary, one having been blown out for repairs and another one lighted to take its place. The foremost independent is operating at between 80 and 85 per cent of ingot capacity and has all three of its blast furnaces going.

The scrap market is dull and both dealers and buyers are marking time.

Pig Iron.—The passing of the holiday lull has brought a revival in interest in spot and first quarter needs. There is also some inquiry for the entire first half and a number of contracts both for first quarter and first half have been closed. Charcoal iron is also in demand, as indicated by a number of 50 to 100-ton sales at $29.04, delivered. Low phosphorus iron is more active, with prices unchanged at $31.20 to $31.60, delivered. A Milwaukee melter has placed 150 tons of 8 per cent silvery at $30.50, f.o.b. Jackson, the price established some time ago for delivery after the first of the year. This is equivalent to $35.29, delivered Chicago. Merchant furnace operations are unaltered and there are no prospects of a change one way or another in the immediate future.

Quotations on Northern foundry, high phosphorus and malleable iron are f.o.b. local furnace, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards.

Northern No. 2 foundry, sil. 1.75 to 2.25	$23.00
Northern No. 1 foundry, sil. 2.25 to 2.75	23.50
Malleable, not over 2.25 sil.	23.00
High phosphorus	23.00
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	29.04
Southern No. 2 (all rail)	27.01
Southern No. 2 (barge and rail)	26.18
Low phos., sil. 1 to 2 per cent, copper free	$31.20 to 31.60
Silvery, sil. 8 per cent	35.29
Ferrosilicon, 14 to 16 per cent	45.25 to 45.75

Structural Material—The tonnage of structural material booked by local mills during the week was the heaviest since last February. Building activity in Chi-

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rolling, 4-in. and over	$35.00 to $36.00
Rolling, 2-in. and smaller	36.00 to 37.00
Forging, ordinary	40.00 to 41.00
Forging, guaranteed	45.00 to 46.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$36.00 to $38.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$35.00 to $37.00
6 in. x 2 in. and smaller	36.00 to 38.00

Skelp

	Per Lb.
Grooved	1.90c.
Sheared	1.90c.
Universal	1.90c.

Wire Rods

	Per Gross Ton
•Common soft, base, No. 5 to ⅜-in.	$45.00
Common soft, coarser than ⅜-in.	$2.50 over base
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

•Chicago mill base is $46. Cleveland mill base, $45.

Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesaba Bessemer, 51.50% iron	4.40
Mesaba non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	9.50c. to 10c.
Iron ore, Swedish, average 66% iron	9.50c.
Manganese ore, washed, 51% manganese, from the Caucasus	45c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, high grade, per unit, in 60% concentrates	$12.00 to $13.00

	Per Ton
Chrome ore, Indian basic, 48% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.50 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, New York	65c. to 70c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$4.75 to $5.25
Foundry, f.o.b. Connellsville prompt	5.50 to 6.00
Foundry, by-product, Ch'go ovens	10.50
Foundry, by-product, New England, del'd	13.00
Foundry, by-product, Newark or Jersey City, del'd	11.52
Foundry, Birmingham	5.75
Foundry, by-product, St. Louis or Granite City	10.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $2.10
Mine run coking coal, f.o.b. W. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. W. Pa. mines	2.00 to 2.25
Steam slack, f.o.b. W. Pa. mines	1.40 to 1.50
Gas slack, f.o.b. W. Pa. mines	1.50 to 1.60

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$115.00
Foreign, 80%, Atlantic or Gulf port, duty paid	115.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$32.00 to $34.00
Domestic, 16 to 19%	31.00 to 33.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$85.00
75%	145.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$42.00	12%	$42.00
11%	42.00	14 to 16%	$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$36.00	12%	$40.00
11%	38.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$28.50	10%	$34.00
7%	29.50	11%	36.00
8%	30.50	12%	38.00
9%	32.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	$1.15 to $1.20
Ferrochromium, 4% carbon and up, 60 to 70% Cr., per lb. contained Cr. delivered	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.25 to $4.00
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electrolytic, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electrolytic, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$17.50
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid,	$17.00 to $17.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works High Duty	Moderate Duty
Pennsylvania	$43.00 to $46.00	$40.00 to $43.00
Maryland	48.00 to 50.00	43.00 to 45.00
Ohio	43.00 to 46.00	40.00 to 43.00
Kentucky	43.00 to 45.00	40.00 to 43.00
Illinois	43.00 to 45.00	40.00 to 43.00
Missouri	40.00 to 43.00	35.00 to 38.00
Ground fire clay, per ton	6.50 to 7.50	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$40.00
Chicago	49.00
Birmingham	54.00
Silica clay, per ton	$8.00 to 9.00

Magnesite Brick

	Per Net Ton
Standard size, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$48.00

Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)

	Per Cent Off List
Machine bolts, small, rolled threads	60 and 10
Machine bolts, all sizes, cut threads	50, 10 and 10
Carriage bolts, smaller and shorter, rolled threads	50, 10 and 10
Carriage bolts, cut threads, all sizes	50 and 10
Eagle carriage bolts	65 and 10
Lag bolts	60, 10 and 10
Plow bolts, Nos. 3 and 7 heads	50 and 10
(Extra of 20% for other style heads)	
Machine bolts, c.p.c. and t. nuts, ⅝ x 4 in.,	45, 10 and 5
Larger and longer sizes	45, 10 and 5
Bolt ends with hot-pressed nuts	50, 10 and 10
Bolt ends with cold-pressed nuts	45, 10 and 5
Hot-pressed nuts, blank and tapped, square,	4c. off list
Hot-pressed nuts, blank or tapped, hexagons,	4.40c. off list
C.p.c. and t. square or hex. nuts, blank or tapped	4.10c. off list
Washers•	6.50c. to 6.25c. off list

•F.o.b. Chicago and Pittsburgh.

The discount on machine, carriage and lag bolts is 5 per cent less than above for less than car lots. On hot-pressed and cold-punched nuts the discount is 25c. less per 100 lb. than quoted above for less than car lots.

Bolts and Nuts

(Quoted with actual freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Semi-finished hexagon nuts:	
⅞ in. and smaller, U. S. S.	80, 10 and 5
⅞ in. and larger, U. S. S.	75, 10 and 5
Small sizes, S. A. E.	80, 10, 10 and 5
S. A. E., ⅝ in. and larger	75, 10, 10 and 5
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60 and 5

Semi-Finished Castellated and Slotted Nuts

(Actual freight allowed up to but not exceeding 50c. per 100 lb.)

(To jobbers and consumers in large quantities)

	Per 100 Net S.A.E.	U.S.S.		Per 100 Net S.A.E.	U.S.S.
¼-in.	$0.44	$0.44	¾-in.	$2.35	$2.40
5/16-in.	0.515	0.515	⅞-in.	3.60	3.60
⅜-in.	0.62	0.66	1-in.	5.65	5.80
7/16-in.	0.79	0.90	1⅛-in.	8.90	8.90
½-in.	1.01	1.05	1¼-in.	12.60	13.10
9/16-in.	1.38	1.42	1⅜-in.	18.35	18.35
⅝-in.	1.70	1.73	1½-in.	21.00	21.00

Larger sizes.—Prices on application.

Large Rivets

	Base Per 100 Lb.
F.o.b. Pittsburgh	$2.60
F.o.b. Cleveland	2.70
F.o.b. Chicago	2.75

Small Rivets

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Milled cap screws	80 and 10
Milled standard set screws, case hardened	80
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U. S. S. thread,	80, 10 and 10
Upset hex. cap screws, S. A. E. thread,	80 and 10
Upset set screws	80, 10 and 10 to 80, 10 and 25
Milled studs	70 and 5

cago continues to grow and a large number of heavy tonnage projects are in the making. Actual awards during the week were light and the bulk of the tonnage now being estimated is made up of projects ranging from 200 to 800 tons each. Construction crews that were forced to abandon outside work during the recent cold snap are back on the job and taking full advantage of an early January thaw.

The mill quotation on plain material is 2.10c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Ferroalloys.—Several car lots of ferromanganese have been placed at $115, seaboard, or $122.56, delivered Chicago. Ferrosilicon and spiegeleisen are quiet, with prices unchanged.

We quote 80 per cent ferromanganese, $122.56, delivered; 50 per cent ferrosilicon, $85, delivered; spiegeleisen, 18 to 22 per cent, $41.76, delivered.

Plates.—Not less than 75,000 tons of plates, shapes and bars will be required for cars which are expected to be placed this week by the Pacific Fruit Express and the Union Pacific. Other Western railroads which have inquired for freight cars include the Southern Pacific and the Burlington. Car builders expect the Rock Island to enter the market soon for 2750 miscellaneous freight cars, and the Illinois Central will soon ask for figures on between 2000 and 3000 cars. Local mills estimate that slightly more than half of the cars bought last year were awarded to Western builders.

The mill quotation is 2.10c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Bars.—Soft steel bar business in December was the heaviest of any month of the past year. Mill prices are firm at 2.10c., Chicago. Demand for bar iron is improving and two leading Western railroads have contracted for 1400 tons at the current quotation of 2c., Chicago. Makers of forging bars state that bookings are in fair volume. Rail steel bar mills are still shipping liberally against old reinforcing contracts. Fence post manufacturers are said to be preparing for an active season. Bed manufacturers and makers of farm implements are busy and specifications received from them are liberal. Rail steel bars are steady at 2c. to 2.10c., Chicago. Alloy steel bars are unchanged in price and the demand is in good volume. Construction is well under way at South Chicago on a new alloy steel mill for the Illinois Steel Co. to cost $4,000,000.

Mill prices are: Mild steel bars, 2.10c.; common bar iron, 2c., Chicago; rail steel bars, 2c. to 2.10c., Chicago.

Jobbers quote 3c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.60c. for rounds and hexagons and 4.10c. for flats and squares; 4.15c. for hoops and 3.65c. for bands.

Jobbers quote hard and medium deformed steel bars at 2.60c.

Hot Rolled Strips.—Demand is well sustained and prices are unchanged at 2.60c. for all sizes, 6 in. in width and narrower, and 2.50c. for wider material.

Sheets.—No changes are recorded in this market, the demand being steady and prices unchanged. Makers report an unusually liberal volume of specifications received over the holiday period. Mills are operating close to the 100 per cent mark.

Chicago delivered prices from mill, 3.50c. for No. 28 black, 2.65c. for No. 10 blue annealed and 4.75c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Jobbers quote f.o.b. Chicago: 3.50c. base for blue annealed, 4.10c. base for black, and 5.25c. base for galvanized.

Wire Products.—Wire mills, which have been operating close to 70 per cent of capacity, are increasing output to build up stocks for the spring demand. An increased demand for field fencing is the outcome of the improved situation of farmers in the Central West and Northwest. Salesmen were sent out the first of the week, which is somewhat earlier than has been the custom during the past few years. Specifications from automobile manufacturers have been materially curtailed within the past few weeks and the trade does not look for much improvement in business from that source until about the first of February. Prices which are without change are shown on page 81.

We quote warehouse prices f.o.b. Chicago: No. 8 black annealed wire, $3.30 per 100 lb.; common wire nails, $3.05 per keg; cement-coated nails, $2.05 to $2.20 per count keg.

Reinforcing Bars.—Tonnage awarded during the week was light, and although a fair number of new projects are appearing from time to time, it is evident that the market has gone into the seasonal slump. Although the warehouse price of billet steel reinforcing bars is steady at the moment at 2.60c., Chicago, reports are insistent that, at least in some instances, tonnage was taken during the rush of Christmas week at figures below the market. Recent awards and new projects are shown on page 93.

Cast Iron Pipe.—Information received here indicates that only two bids were submitted on Detroit's inquiry for 4500 tons of 36-in. Class C pipe. B. Nicoll & Co., representing a French maker, was low with a price of $42.48, delivered, and the United States Cast Iron Pipe & Foundry Co. bid $42.60. Deducting $7.95, the freight from Birmingham to Detroit, the American bid was equivalent to $34.65, base Birmingham. The local trade expects both Bloomington, Ind., and Downer's Grove, Ill., to close within the week. The Chicago market is unchanged at $42, base Birmingham, for 6-in. and larger sizes.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $54.20; 6-in. and over, $50.20; Class A and gas pipe, $4 extra.

Bolts, Nuts and Rivets.—Although orders have not been so heavy during the past few weeks, makers have substantial backlogs and have not changed their rate of operations, which is still close to 75 per cent of capacity. Contracts for the present period are practically closed and prices are unchanged.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.70c.; machine bolts up to ⅞ x 4 in., 50 and 5 per cent off; larger sizes, 50 and 5 off; carriage bolts up to ⅞ x 4 in., 47½ off; larger sizes, 47½ off; hot-pressed nuts, square, tapped or blank, $3.25 off; hot-pressed nuts, hexagon, tapped or blank, $3.75 off; coach or lag screws, 55 and 5 per cent off.

Rails and Track Supplies.—Western rail mills are speeding up to meet the demands of a number of railroads for deliveries against recent contracts. One producer has booked 25,000 tons of rails in miscellaneous lots. Local orders for track materials include 3000 tons of spikes and bolts taken by one mill and 3000 tons of miscellaneous track supplies taken by another. Iron tie plates are said to be in good demand and a fair tonnage was placed during the week.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, 1.80c. to 1.90c., f.o.b. maker's mill.

Standard railroad spikes, 2.90c. to 3c. mill; track bolts with square nuts, 3.90c. to 4c. mill; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.55c., base, and track bolts, 4.55c., base.

Coke.—Shipments are steadily going forward against contracts, and it is reported that some ovens are booked to capacity and cannot take orders for spot shipment. By-product foundry coke remains unchanged at $10.50, ovens, or $11, delivered in the Chicago switching district.

Old Material.—The market is exceptionally dull and trading is practically at a standstill. The only commodity which is at all active is borings. No transactions are reported in heavy melting steel and users are inspecting shipments more rigidly and rejecting when specifications are not strictly adhered to. Some dealers believe that the market is close to the bottom. This is not based on any broad change in the situation, but rather upon rough estimates of users' present stocks and the current rate of consumption. A few scattered small inquiries for low phosphorus grades have been received from foundries which are largely concerned

(*Concluded on page* 91)

Philadelphia

Pennsylvania Railroad Buys 30,000 to 40,000 Tons of Steel for First Quarter

PHILADELPHIA, Jan. 5.—The only new business of importance during the first few days of the new year was the placing of orders by the Pennsylvania Railroad for about 30,000 to 40,000 tons of plates, shapes and bars covering the road's first quarter requirements. The inquiries called for about 40,000 tons, but the business was split up among so many mills that it was difficult to check the total. Plates made up possibly one-half or more of the tonnage, both Eastern and Pittsburgh mills sharing in the orders.

All of the markets are quiet, but local offices of steel companies report having received large specifications in the last few days of the old year applying on fourth quarter contracts. Almost without exception consumers and jobbers specified their quotas in full. Extensions were given in a few cases, particularly on wire products because distributors did not want stocks coming in until after inventory.

Pig Iron.—The pig iron market is extremely quiet. Sales are confined to small lots. Producers of iron are not urging sales as they are all comfortably well off for orders and consumers are well protected for the first quarter; hence the only business is to provide for additional requirements which the increasing melt at some foundries has made necessary. Prices are unchanged but firm on the basis of $23, furnace, for foundry grades. An inquiry for 6000 tons of basic iron for first quarter will probably be closed this week on the basis of about $23, delivered.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.76 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 24.63
East. Pa. No. 1X	24.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.67 to 28.67
Virginia No. 2X, 2.25 to 2.75 sil.	28.17 to 29.17
Basic, delivered eastern Pa.	23.00 to 23.50
Gray forge	23.00 to 23.50
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	24.00 to 25.00
Copper bearing low phos. (f.o.b. furnace)	24.50

Ferroalloys.—Demand for ferromanganese is very light. The price quoted by importers and the domestic maker remains unchanged at $115.

Billets.—Eastern mills are now quoting open-hearth rerolling billets at $36, Pittsburgh, and forging quality at $41, Pittsburgh.

Plates, Shapes and Bars.—Aside from the orders of the Pennsylvania Railroad, mentioned in the opening paragraph of this report, there has been no important buying, but specifications at the end of December were heavy. In the case of plates, some of the tonnage specified was at $2 to $4 a ton below today's quoted price of 1.80c., Pittsburgh. The nominal quotation for structural shapes is 1.90c., Pittsburgh, but in the immediate Philadelphia territory some sales have been made at the equivalent of 1.80c. and 1.85c., Pittsburgh. Steel bars are firm at 2c., Pittsburgh, and bar iron remains at 2.2c., Philadelphia.

Warehouse Business.—Local warehouses have adopted new warehousing differentials on cold finished steel as follows: Under 100 lb., $1 per 100 lb. extra; 100 to 299 lb., inclusive, 75c. per 100 lb.; 300 to 499 lb., inclusive, 50c. per 100 lb.; 500 lb. or more, no extra. For local delivery warehouses quote as follows:

Soft steel bars and small shapes, 3.20c.; iron bars (except bands), 3.20c.; round edge iron, 3.50c.; round edge steel, iron finished, 1½ x ½ in., 3.50c.; round edge steel, planished, 4.30c.; tank steel plates, ¼ in. and heavier, 2.80c. to 3c.; tank steel plates, ⅜ in., 3c.; blue annealed steel sheets, No. 10 gage, 3.50c.; black sheets, No. 28 gage, 4.65c.; galvanized sheets, No. 28 gage, 5.85c.; square, twisted and deformed steel bars, 3c.; structural shapes, 2.75c. to 2.90c.; diamond pattern plates, ¼ in., 5.30c.; ⅜ in., 5.50c.; spring steel, 5c.; rounds and hexagons, cold-rolled steel, 4c.; squares and flats, cold-rolled steel, 4.50c.; steel hoops, 4.25c., base; steel bands, No. 12 gage to ⅜ in., inclusive, 3.90c.; rails, 3.20c.; tool steel, 8.50c.; Norway iron, 6.50c.

Imports.—More than 6000 tons of pig iron came in last week at Philadelphia from the following countries: England, 2775 tons; the Netherlands, 1975 tons; France, 900 tons; India, 397 tons. Other imports were 555 tons of blooms from France and 55 tons of structural steel from Belgium. Due to an error in the Customs' reports, the statement was made last week that 1250 tons of ferromanganese had arrived from India. Investigation showed that this should have read manganese ore.

Old Material.—There is little activity in the scrap market. Prices remain as quoted a week ago. A few small sales of heavy melting steel have been made at $18, delivered.

We quote for delivery, consuming points in this district, as follows:

No. 1 heavy melting steel	$17.50 to $18.00
Scrap rails	17.00 to 17.50
Steel rails for rolling	18.50 to 19.00
No. 1 low phos. heavy 0.04 and under	22.00 to 22.50
Couplers and knuckles	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Cast iron car wheels	18.50 to 19.00
No. 1 railroad wrought	18.50 to 19.00
No. 1 yard wrought	17.00 to 17.50
No. 1 forge fire	15.50 to 16.00
Bundled sheets (for steel works)	14.50 to 15.00
Mixed borings and turnings (for blast furnace)	14.00 to 14.50
Machine shop turnings (for steel works)	14.50 to 15.00
Machine shop turnings (for rolling mill)	15.00 to 15.50
Heavy axle turnings (or equivalent)	15.50 to 16.00
Cast borings (for steel works and rolling mill)	14.50 to 15.00
Cast borings (for chemical plant)	17.00 to 17.50
No. 1 cast	18.50 to 19.50
Heavy breakable cast (for steel works)	17.50 to 18.00
Railroad grate bars	15.00
Stove plate (for steel works)	15.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	23.00 to 24.00
Steel axles	24.00 to 25.00

San Francisco

German Tubing Bought — Foreign Pig Iron Weakens—1926 Outlook Promising

SAN FRANCISCO, Dec. 31 (*By Air Mail*).—German interests have taken 1500 tons of steel for penstocks for the San Joaquin Light & Power Co., Fresno, Cal., at a price understood to be about 20 per cent under the lowest American bid. Seamless steel tubing will be furnished for this work by the Ferrum Co. of Germany. About 200 tons of riveted pipe for the same project is still pending. This transaction and price shading in foreign pig iron, have been the features of the last week of the year. Quotations of $24 a ton have been made on Continental iron during the week, and lower offers for first quarter contracts are reported.

Pacific Coast lettings in fabricated steel calling for 100 tons and over, during 1925, as reported by the San Francisco office of THE IRON AGE, total 260,386 tons. Smaller awards known to have been closed bring this figure up to approximately 270,000 tons. Lettings of reinforcing bars reported during the year total 52,000 tons, and in cast iron pipe, contracts known to have been placed amount to about 70,000 tons. Fabricated steel closed in 1924 is estimated at 170,000 tons, or about 100,000 tons less than in 1925. In reinforcing bars the 1925 total exceeds that of the preceding year by about 5000 tons, and in cast iron pipe, lettings for 1925 average about 23,000 tons better than in 1924.

The outlook for 1926 is regarded locally as particularly promising. Plans are being prepared for several large projects and consideration is being given to proposals for new work in various fields where plates and structural material will be required.

Pig Iron.—Last minute efforts on the part of some sellers to close contracts for the first quarter have resulted in a general weakening of quotations on foreign pig iron. Continental iron has been quoted at $24 a ton, duty paid, f.o.b. cars San Francisco, and reports of lower offers have been heard. The price of Utah

iron remains unchanged, reports of lower quotations lacking confirmation. A shipment of about 500 tons of Indian iron has been received by a local importer who has contracted for monthly deliveries during 1926. This iron, with a silicon content of 2.75 to 3.25 per cent, is being quoted at $25, duty paid, f.o.b. cars here. A small lot of Chinese iron, silicon, 3 to 3.50 per cent, is being offered at $25.50, duty paid, f.o.b. cars.

*Utah basic	$27.00 to $28.00
*Utah foundry, sil. 2.75 to 3.25	27.00 to 28.00
**English foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Belgian foundry, sil. 2.75 to 3.25	24.00
**Dutch foundry, sil. 2.75 to 3.25	24.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.00
**Chinese foundry, sil. 3 to 3.50	25.50

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Fabricated steel lettings for the week total about 3000 tons, and fresh inquiries call for 1250 tons. The largest individual letting, 2400 tons, for two ferries for the Key System Transit Co., was taken by the Moore Dry Dock Co., Oakland. Two bridges across the Gillespie Dam in Arizona call for about 1000 tons. Eastern mill quotations are firm at 2.35c. to 2.40c., c.i.f. Coast ports.

Plates.—Fresh inquiries are small, but a number of projects are being figured and are expected to come up shortly after the first of the year. While 2.30c. to 2.35c., c.i.f. Coast ports, is being quoted by practically all of the Eastern mills, a local fabricator is understood to have contracted during the week for deliveries of 100 to 200 tons a month during the first quarter at less than 2.30c.

Bars.—No local lettings are known to have been closed. In the Los Angeles district about 719 tons have been placed recently. Reinforcing bar jobbers continue to make price concessions. Current quotations are nominal at 2.75c. to 2.85c., base per lb., on less-than-carload lots. On larger lots, 2.50c. is understood to be possible. On soft steel bars Eastern mills are asking 2.30c. to 2.35c., c.i.f. Coast ports, and local mills are quoting 2.35c. to 2.40c., f.o.b. cars San Francisco.

Warehouse Business.—Little business of any size has been transacted during the week because of the holidays and inventories. Prices are unchanged, although nail quotations are understood to have been shaded recently in connection with several orders.

Merchant bars, $3.30 base, per 100 lb.; merchant bars, ⅜ in. and under, rounds, squares and flats, $3.80 base, per 100 lb.; soft steel bands, $4.15 base, per 100 lb.; angles, ⅞ in. and larger x 1½ in. to 2¾ in., inc., $3.30 base, per 100 lb.; channels and tees, ¾ in. to 2¾ in., inc., $3.90 base, per 100 lb.; angles, beams and channels, 3 in. and larger, $3.30 base, per 100 lb.; tees, 3 in. and larger, $3.30 base, per 100 lb.; universal mill plates, ¼ in. and heavier, stock lengths, $3.30 base, per 100 lb.; spring steel, ¼ in. and thicker, $6.30 base, per 100 lb.; wire nails, $3.50 base, per 100 lb.; cement coated nails, $3 base, per 100 lb.; No. 10 blue annealed sheets, $3.75 per 100 lb.; No. 28 galvanized sheets, $6 per 100 lb.; No. 28 black sheets, $4.75 per 100 lb.

Cast Iron Pipe.—The city of Whittier, Cal., has awarded 100 tons of 6, 4, and 8-in. Class B pipe to the United States Cast Iron Pipe & Foundry Co. The city of Santa Monica, Cal., is expected to be in the market soon for a substantial tonnage. Prices are unchanged at about $50 base, water shipment, San Francisco.

Steel Pipe.—The Pacific Gas & Electric Co., San Francisco, has placed 800 tons of 1 to 5-in. standard line pipe with two Eastern mills, and the San Joaquin Light & Power Co., Fresno, has placed two carloads of line pipe with a local jobber. The city of Los Angeles is inquiring for 220 tons of 6-in. Matheson joint pipe under Specification 786-A.

Rails and Track Supplies.—An unnamed inquiry for 500 tons of rails has come into the market. The Southern Pacific Co., San Francisco, has taken no action yet on the 25,000 tons of rails it is inquiring for, but it has put out an inquiry for about 100 tons of rivets, and has placed 13,000 car wheels with an Eastern mill.

Coke.—A shipment of 4000 tons of English coke has been received by a local importer. Inquiries in the market are mostly for small tonnages. Importers' prices are unchanged.

English beehive, $15 to $16 at incoming dock, and English by-product, $12 to $14; German by-product, $11.50 to $12.

Boston

Imported Iron One-Third of 1925 Sales in New England—Gas Pipe Sales

BOSTON, Jan. 5.—The pig iron market is quiet as it enters the new year, but the outlook is hopeful. A sale of several hundred tons of high manganese iron, silicon 2.25 to 2.75 per cent, for prompt shipment to a Springfield, Mass., foundry was the outstanding transaction the past week. Nothing new has developed in prices. Estimates of iron sold in New England in 1925 vary somewhat, but average around 350,000 tons, contrasted with approximately 500,000 tons, the normal melt. Heretofore, the Buffalo district has supplied about 40 per cent of the iron used annually in New England, eastern Pennsylvania about 40 per cent, and western Pennsylvania, New York State, Virginia and Alabama the remaining 20 per cent. In 1925 the Buffalo district just about held its share, but imported iron constituted fully one-third of the total sold and displaced to a large extent eastern and western Pennsylvania, New York State and Virginia irons. Alabama iron just about held its own. The new year gives promise of a further switching about between sources of supply because of the new Troy, N. Y., and Everett, Mass., furnaces. Most of the important melters are operating at, or close to, 100 per cent of capacity, but with the small jobbing foundries on reduced schedules. No open inquiries are in the hands of brokers, but one house is negotiating with a foundry for 3500 to 4000 tons of iron for second quarter, and indications point to other melters entering the market for second quarter requirements at an early date.

We quote delivered prices on the basis of the latest sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25	$26.65
East. Penn., sil. 2.25 to 2.75	27.15
Buffalo, sil. 1.75 to 2.25	$25.91 to 26.91
Buffalo, sil. 2.25 to 2.75	26.41 to 27.41
Virginia, sil. 1.75 to 2.25	29.92
Virginia, sil. 2.25 to 2.75	30.42
Alabama, sil. 1.75 to 2.25	31.60 to 32.60
Alabama, sil. 2.25 to 2.75	32.10 to 33.10

Cast Iron Pipe.—The Boston Consolidated Gas Co. has placed 4000 tons of pipe and fittings with the Warren Foundry & Pipe Co. The same foundry has taken 800 tons of 4-in. and 6-in. pipe from the Lawrence Gas Co., Lawrence, Mass., and 400 tons of 6-in. to 36-in. pipe from Hartford, Conn. After some delay Providence, R. I., has placed 600 tons of 6-in. to 24-in. pipe with the United States Cast Iron Pipe & Foundry Co. All of the New England utility companies with headquarters in Boston have covered their 1926 gas pipe requirements, the aggregate amount placed being fully 20,000 tons. Prices are strong. Common talk is that base prices on pipe will be $1 to $2 a ton higher within a month. Current quotations on domestic pipe follow: 4-in., $60.10 per ton, delivered common Boston freight rate points; 6-in. to 16-in., $56.10; 20-in. and larger, $55.10. The usual $5 differental is asked on Class A and gas pipe.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. announce that January specifications against first half by-product foundry coke contracts will be on a basis of $13 a ton, delivered, within a freight rate zone of $3.10. The Providence Gas Co. is confining its deliveries as closely as possible to a $2.52 freight rate zone. The $13 price is the same as for December. Both companies report a seasonal slowing up in foundry coke shipments and a continued active demand for domestic coke. Retail dealers, particularly those in Massachusetts, show less interest in imported and Connellsville domestic cokes. Many cars of Connellsville coke are standing on track all over Massachusetts, refused by consignees because of poor quality. Efforts have been made to dispose of it because of mounting charges, but so far as known have made sales only in Chicopee, Mass., at $4 a gross ton, or about $3.50 a net ton.

Imports.—Final figures for 1925 imports of pig iron are virtually unchanged from those already given.

Approximately 100 tons from a Scandinavian port arrived at the last minute, bringing the grand total up to 90,621 tons. If the amounts of iron landed at Providence, R. I., and shipped into New England from New York are added, it is assumed that something like 125,000 tons of foreign iron displaced domestic iron. Complete returns for coke imports bring the total for December up to 25,385 tons, contrasted with 20,734 tons for November.

Old Material.—The movement of old material is still limited. Transactions largely cover car lots of heavy melting steel, turnings, forged scrap and skeleton for New England consumption. The prevailing market on heavy melting steel is $12 to $12.50 a ton, on cars shipping point, $13 having disappeared as a going price. Since orders for scrap rails are filled, prices are softer. The movement of scrap out of New England, if anything, is smaller. A slightly firmer tendency of prices in the Pittsburgh district has been without material influence here. Connecticut foundries are in the market for railroad malleable at around $20 a ton, delivered, with the supply apparently limited. New England foundries continue to buy machinery cast from local or nearby yards. The movement of old material in 1925 is generally estimated at about 75 per cent of the 1924 total.

The following prices are for gross ton lots delivered consuming points:

Textile cast	$20.00 to $20.50
No. 1 machinery cast	19.50 to 20.00
No. 2 machinery cast	15.50 to 16.50
Stove plate	14.50 to 15.00
Railroad malleable	19.50 to 20.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
No. 1 railroad wrought	13.25 to 13.50
No. 1 yard wrought	12.25 to 12.75
Wrought pipe (1 in. in diameter, over 2 ft. long)	11.50 to 12.00
Machine shop turnings	9.50 to 10.00
Cast iron borings, chemical	11.50 to 12.00
Cast iron borings, rolling mill	9.50 to 10.00
Blast furnace borings and turnings	9.00 to 9.50
Forged scrap	10.00 to 10.50
Bundled skeleton, long	10.00 to 10.50
Forged flashings	10.00 to 10.50
Bundled cotton ties, long	9.00 to 9.50
Bundled cotton ties, short	10.00 to 10.50
Shafting	18.25 to 18.75
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00
Scrap rails	12.00 to 12.50

St. Louis

Missouri-Kansas-Texas Buys 10,000 Tons of Rails—Inquiries for Track Supplies

ST. LOUIS, Jan. 5.—The only activity in the pig iron market is pressure on furnaces to hasten shipments against contracts. Buying has been confined to a few carloads, and there are no inquiries of size pending. Melters in the district are well covered on their requirements for the first quarter, and no great buying movement is expected until books are opened for second quarter. The Midland Coke & Iron Co. expects to open its second quarter books about Jan. 15. The market is firm at unchanged prices.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $4.42 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$25.66
Northern malleable, sil. 1.75 to 2.25	25.66
Basic	25.66
Southern fdy., sil. 1.75 to 2.25	$26.42 to 27.92
Granite City iron, sil. 1.75 to 2.25	24.31 to 24.81

Finished Iron and Steel.—Railroad purchases featured the closing days of 1925. The Missouri-Kansas-Texas Railroad bought 10,000 tons of 90-lb. rails, of which 5500 tons for western Texas and Oklahoma use went to the Colorado Fuel & Iron Co. and the remaining 4500 tons was equally divided between the Illinois Steel Co. and the Inland Steel Co. The Wabash Railway is in the market for 1,000,000 tie plates for 80, 90 and 100-lb. rails, 14,000 kegs of track spikes and 3000 kegs of track bolts. The Mobile & Ohio Railroad is in the market for 2500 to 4000 kegs of track spikes and 400 to 700 kegs of track bolts for the first six months of 1926. Mills report that a few orders for first quarter delivery are trickling in from warehouses and manufacturing users of steel. Business among structural fabricators is light.

For stock out of warehouse we quote: Soft steel bars, 3.15c. per lb.; iron bars, 3.15c.; structural shapes, 3.25c.; tank plates, 3.25c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, cold rolled, one pass, 4.60c.; galvanized sheets, No. 28, 5.70c.; black corrugated sheets, 4.65c.; galvanized, 5.75c.; cold rolled rounds, shafting and screw stock, 3.75c.; structural rivets, 3.65c.; boiler rivets, 3.85c.; tank rivets, $\frac{7}{8}$ in. diameter and smaller, 70 per cent off list; machine bolts, 55 per cent; carriage bolts, 50 and 5 per cent; lag screws, 55½ per cent; hot-pressed nuts, square, $3.25; hexagon, blank or tapped, $3.75 off list.

Coke.—Demand for both domestic and foundry coke continues strong. Colder weather, together with the anthracite strike, has created an exceptionally strong demand for domestic grades, and the by-product ovens are shipping their full production. The Midland Coke & Iron Co. is out of the market.

Old Material.—The market is marking time. Prices are unchanged, and a few sales at present levels were reported during the week. A heavy buying movement is expected by dealers early in January. Dealers report that 1925 was not a profitable year because of the inactivity during the first seven months. Railroad lists include: Pennsylvania System, 37,000 tons; Chicago, Milwaukee & St. Paul, 4500 tons, and Chicago, Burlington & Quincy, 5000 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$14.50 to $15.00
Rails for rolling	18.25 to 18.75
Steel rails less than 3 ft.	19.25 to 19.75
Relaying rails, 60 lb. and under	24.00 to 25.00
Relaying rails, 70 lb. and over	30.00 to 31.00
Cast iron car wheels	18.00 to 18.50
Heavy melting steel	15.00 to 15.50
Heavy shoveling steel	15.00 to 15.50
Frogs, switches and guards cut apart	17.50 to 18.00
Railroad springs	19.00 to 19.50
Heavy axles and tire turnings	13.00 to 13.50
No. 1 locomotive tires	16.50 to 17.00

Per Net Ton

Steel angle bars	15.00 to 15.50
Steel car axles	17.50 to 18.00
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	19.50 to 20.00
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	13.25 to 13.75
Cast iron borings	11.00 to 11.50
No. 1 busheling	11.50 to 12.00
No. 1 railroad cast	15.00 to 15.50
No. 1 machinery cast	17.00 to 17.50
Railroad malleable	14.50 to 15.00
Machine shop turnings	8.50 to 9.00
Bundled sheets	8.75 to 9.25

Toronto

Canadian Steel Output Gains in 1925—Pig Iron Exported to United States

TORONTO, ONT., Jan. 5.—The iron and steel industry of Canada starts the new year on a much stronger footing than twelve months ago. While there has been very little change in the outlook for the foundry industry, which continues to operate at about 50 per cent, more active business in that line is expected. Steel business has been fairly good for some time past. Mills at Sydney, N. S., and at Hamilton, Ont., have been actively engaged, running between 75 and 90 per cent for the past three months, with sufficient orders on their books to keep them going at that rate for a couple of months longer. The Sault Ste. Marie, Ont., mills curtailed operations about six weeks ago, but have large rail orders on hand which will be rolled early next

spring. Reports from that city state that additional blast furnaces are to be blown in soon.

In the production of iron and steel the first nine months of the year showed a decided decline from that of 1924, but in the closing quarter output rose sufficiently to bring the total for the year above that of 1924. Higher prices now prevailing in certain lines in the United States have placed Canadian producers in a better position to export. Recently Canadian pig iron producers have again turned to the United States as an outlet for their surplus iron, and several thousands of tons are said to have been shipped across the international boundary.

The opening of the new year brought with it an advance in the Canadian price of pig iron of 50c. per ton, but according to local blast furnace representatives the prevailing price is still slightly below that of United States iron in this market. Canadian prices, f.o.b. Toronto, are as follows: No. 1 foundry (2.25 to 2.75 per cent silicon), $26.85; malleable, $26.85; No. 2 foundry (1.75 to 2.25 per cent silicon), $26.35. The Montreal price on all grades is $28.75, the differential between No. 1 and No. 2 foundry not yet having been restored.

Cincinnati

Heavy Steel Bookings in December—Sarah Furnace to Go In

CINCINNATI, Jan. 5.—While the pig iron market has been dormant because of the usual seasonal lull, signs of a renewal of buying are not lacking. However, consumer interest is not expected to result in large scale buying until the latter part of January or the first half of February, when melters will contract for their second quarter requirements. Foundry iron in the Ironton district remains at $21 to $21.50, base Ironton, with the larger tonnages being sold at the former figure. Although no price has been set for second quarter, the impression prevails that Ironton producers will soon accept business for that delivery at not more than $21.50, furnace. Alabama furnaces, with sufficient business on hand to cover their first quarter output, are still out of the market, so that the quotation of $22 base Birmingham, is merely nominal. Tennessee iron can be secured at $22, base Birmingham, but only small lots are in demand. The silvery market is quiet, with 8 per cent selling at $30.50, Jackson. The Ross Meehan Co., Chattanooga, Tenn., is inquiring for 1000 tons of malleable iron for first half delivery, and a Dayton, Ohio, foundry is expected to buy 500 tons of Northern foundry iron. The Belfont Steel & Wire Co., Ironton, Ohio, will blow in its Sarah furnace about Jan. 15.

Based on freight rates of $3.69 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Alabama fdy., sil. 1.75 to 2.25 (base)	$25.69
Alabama fdy., sil. 2.25 to 2.75	26.19
Tennessee fdy., sil. 1.75 to 2.25	25.69
Southern Ohio silvery, 8 per cent	32.77
Southern Ohio fdy., sil. 1.75 to 2.25	$23.27 to 23.77
South'n Ohio, malleable (nominal)	23.27 to 23.77

Finished Material.—The volume of business in December was the largest of any month in the history of the local district office of an important mill. Another company reports that its specifications and orders in the past week were greater than those of any previous week since September. A nearby sheet manufacturer declares that bookings and shipments in the last month paralleled those of November, which was the best month of the year. The encouraging condition of the market is ascribed to a general improvement among consuming industries, with railroads and structural work taking the most steel. Bars are showing strength at 2c. to 2.10c., base Pittsburgh, and specifications are considered satisfactory. The development of a fairly active demand for plates has encouraged mills to adhere more consistently to 2c., base Pittsburgh, although attractive tonnages can still be purchased at 1.90c. The Louisville & Nashville is reported to have placed 800 tons of plates with a Southern producer, while the Big Four has not yet closed for 1700 tons on which bids have been taken. The shape market is steady with prices ranging from 2c. to 2.10c., base Pittsburgh. Sheet specifications have been liberal, and quotations are being well maintained at the schedule set several weeks ago. Mills in this territory are operating at approximately 88 per cent of capacity, and the backlog is so heavy that it was necessary to continue production through the holiday season, with the exception of a two-day suspension of operation over Christmas. The sale of wire goods has been fairly good. Common wire nails are quoted at $2.65 per keg, Pittsburgh or Ironton, and plain wire at $2.50 per 100 lb., Pittsburgh or Ironton. The Big Four is in the market for approximately 2000 tons of wire products, including a considerable amount of fencing, for its first quarter requirements. Fabricators are gratified at the number of sizable jobs which have appeared lately.

Warehouse Business.—Total sales in December ran slightly ahead of those in November, because of the well sustained demand for bars, plates and sheets. Jobbers are anticipating good business during January. Prices remain firm and unchanged.

Cincinnati jobbers quote: Iron and steel bars, 3.30c.; reinforcing bars, 3.30c.; hoops, 4c. to 4.25c.; bands, 3.95c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds and hexagons, 3.85c.; squares, 4.35c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.10c. to 4.30c.; No. 28 galvanized sheets, 5.25c. to 5.40c.; No. 9 annealed wire, $3 per 100 lb.; common wire nails, $2.95 per keg base; cement coated nails, $2.25 per keg; chain, $7.55 per 100 lb. base; large round head rivets, $3.75 base; small rivets, 65 per cent off list. Boiler tubes: prices net per 100 ft. lap-welded steel tubes, 2-in., $18; 4-in., $38; seamless, 2-in., $19; 4-in., $39.

Tin Plate.—Several large can manufacturers are expected to contract for their first quarter needs in the next 10 days. Sellers anticipate that the tonnage will be only fair in volume. Prices are strong at $5.50 per base box, Pittsburgh.

Reinforcing Bars.—Prices are steady at 2c., Cleveland, for new billet bars and 1.90c., mill, for rail steel bars.

Coke.—Both foundry and domestic grades of by-product coke are showing strength. The movement of Wise County and New River foundry coke is fairly steady. Prices are firm and unchanged. The Ironton By-Product Coke Co. will furnish coke for the Sarah furnace of the Belfont Steel & Wire Co., Ironton, Ohio, when it blows in the middle of the month.

Based on freight rates of $2.14 from Ashland, Ky., $3.53 from Connellsville, and $2.59 from Wise County ovens, and $2.90 from New River ovens, we quote f.o.b. Cincinnati: Connellsville foundry, $8.53 to $9.53; Wise County foundry, $8.09 to $9.59; New River foundry, $9.90 to $10.90; by-product foundry, $10.64.

Old Material.—Buying has been confined to small lots, and little improvement is looked for this month. Recent railroad offerings have brought lower prices than prevailed a few weeks ago, and slight weakness has developed in several items. Dealers' stocks are rather heavy.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton

Heavy melting steel	$14.50 to $15.00
Scrap rails for melting	14.50 to 15.00
Short rails	18.50 to 19.00
Relaying rails	27.50 to 28.00
Rails for rolling	15.50 to 16.00
Old car wheels	14.00 to 14.50
No. 1 locomotive tires	17.00 to 17.50
Railroad malleable	16.00 to 16.50
Agricultural malleable	15.00 to 15.50
Loose sheet clippings	10.00 to 10.50
Champion bundled sheets	11.50 to 12.00

Per Net Ton

Cast iron borings	9.50 to 10.00
Machine shop turnings	8.00 to 8.50
No. 1 machinery cast	20.00 to 20.50
No. 1 railroad cast	16.00 to 16.50
Iron axles	23.00 to 23.50
No. 1 railroad wrought	12.00 to 12.50
Pipes and flues	9.50 to 10.00
No. 1 busheling	10.50 to 11.00
Mixed busheling	9.50 to 10.00
Burnt cast	10.00 to 10.50
Stove plate	11.00 to 11.50
Brake shoes	11.00 to 11.50

Cleveland

Heavy Specifying Against Expiring Contracts—Semi-Finished Stronger

CLEVELAND, Jan. 5.—Specifications for finished steel against expiring contracts were heavy the past week and very little fourth quarter tonnage was left on the books. While the tonnage booked in this territory in actual specifications by some of the mills in December was less than in November, it was somewhat above the monthly average for 1925. Mills have good specifications for the next few weeks for steel bars, plates and structural material. There is little new inquiry, as there are very few consumers that are not covered for at least part of their first quarter requirements. Delivery promises have shown little change the past month, indicating that production and consumption are about in equal volume. Consumers, as a rule, continue to carry low stocks and depend upon the mills for service in the way of quick shipments. As mills are not being crowded for deliveries against specifications, they are usually able to make fairly prompt shipments, when required. Prices are steady and little effort is being made to secure advances. There is no deviation from 2c., base Pittsburgh, on steel bars. On plates 1.90c. is the ruling quotation. However, at least one mill is still on a 1.85c., Pittsburgh base, and a price of 1.80c. continues to crop out on desirable inquiries. Structural material ranges from 1.90c. to 2c. Little new inquiry is coming out in the structural field. Not much activity is looked for in the Lake ship building industry for some time. Inquiries for four boats have been pending for some time but two of these have been withdrawn and the higher cost of steel as compared with that of a few months ago is not an incentive to placing boat orders.

Pig Iron.—Some inquiry is coming out for foundry iron for the second quarter, but so far furnaces have not made quotations and those that are on the present $20.50, Valley base are not showing any desire to book business at present for that period, although they are satisfied that consumers would be unwilling to pay more at this time. However, some of the Lake furnaces that are on a $23 base have made sales through the first half at that price and do not expect to ask any more for the second quarter. While there is some talk of higher ore prices, which would have a bearing on pig iron prices, the advance is not sufficiently imminent to warrant much consideration by pig iron producers. A Cleveland maker who has been out of the market for some time is now offering high silicon iron at $22 base, and expects to open books shortly for No. 2 foundry iron for the second quarter. Sales continue light, with aggregate bookings of about 5000 tons by Cleveland interests during the week. A good volume of shipping orders has come out in the past day or two, following the slowing down during the inventory period, and producers look for heavy shipments through the present month.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6.01 from Birmingham:

Basic, Valley furnace	$20.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25	22.26
Southern fdy., sil. 1.75 to 2.25....$27.01 to	28.01
Malleable	22.26
Ohio silvery, 8 per cent	32.52
Standard low phos., Valley furnace	28.00 to 28.50

Semi-Finished Steel.—The market is very firm and the sources of new supply are limited, as most mills have made commitments for about all the material they will have available for the first quarter. Sales the past week included 15,000 tons of slabs at $38, Youngstown, and 9000 tons of sheet bars at $38, Pittsburgh—both lots being for the first quarter and going to a Cleveland mill. The local producer is now holding to $40 for all forms of semi-finished steel and has sold 500 tons of billets and slabs in the Chicago territory at $40, Cleveland, and a small lot of high carbon slabs at $42, charging $2 a ton differential for carbon.

Sheets.—All the mills have a good amount of contract tonnage for the first quarter and some are obligated for their entire output. With this situation mills are now mainly interested in specifications, which are coming out in good volume. The market is firmer than it has been for months. With good order books and a higher price on sheet bars, mills are not disposed to shade regular quotations.

Warehouse Business.—Cleveland jobbers this week expect to advance prices on sheets out of stock which were not marked up at the time of the last advance in mill prices. Warehouse business generally is good.

Jobbers quote steel bars, 3.10c.; plates and structural shapes, 3.20c.; No. 28 black sheets, 3.95c.; No. 28 galvanized sheets, 5.10c.; No. 10 blue annealed sheets, 3.15c.; cold-rolled rounds and hexagons, 3.90c.; flats and squares, 4.40c.; hoops and bands, 3.85c.; No. 9 annealed wire, $3 per 100 lb.; No. 9 galvanized wire, $3.45 per 100 lb.; common wire nails, $3 base per 100 lb.

Reinforcing Bars.—The demand is light, but improvement is looked for shortly. An inquiry is out for a factory building for the W. S. Tyler Co., Cleveland, requiring 300 tons. Rail steel bars are unchanged at 1.80c. to 1.90c., mill.

Coke.—The demand for by-product coke for domestic use has again quieted down, being influenced by the prospects of an anthracite strike settlement and by warmer weather. The market lacks strength, although producers are asking $8.50, ovens, for egg sizes and $9 for nut coke. Heating coke is weak at $4.50 to $4.75, ovens. Connellsville foundry coke ranges from $5.50 to $6, ovens.

Bolts, Nuts and Rivets.—Rivet specifications have been heavy the past few days, because consumers have been ordering shipments against expiring contracts taken at $2.50, Pittsburgh. New contracts for the first quarter at $2.60, base, Pittsburgh, are being taken in good volume. The bolt and nut trade is still affected by the inventory period lull.

Old Material.—With very little buying by consumers and the holding up of shipments during the inventory period, the market remains almost at a standstill. Consumers are expected to begin releasing shipments this week. Some distress material has come on the market, going at low prices, and this has had a general weakening effect. A small lot of heavy melting steel offered by the Nickel Plate railroad brought $17.26. The Pennsylvania will take bids Wednesday on a list of 35,000 tons or more and the Erie will receive bids on a blank list the same date.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$17.00 to $17.25
Rails for rolling	16.75 to 17.00
Rails under 3 ft	19.50 to 20.00
Low phosphorus melting	19.00 to 19.25
Cast iron borings	14.00 to 14.50
Machine shop turnings	13.25 to 13.75
Mixed borings and short turnings	14.00 to 14.50
Compressed sheet steel	15.50 to 16.00
Railroad wrought	14.50 to 15.00
Railroad malleable	20.50 to 21.00
Light bundled sheet stampings	12.50 to 12.75
Steel axle turnings	15.25 to 15.50
No. 1 cast	18.00 to 18.50
No. 1 busheling	14.25 to 14.50
Drop forge flashings	14.75 to 15.00
Railroad grate bars	13.75 to 14.00
Stove plate	13.75 to 14.00
Pipes and flues	11.50 to 12.00

Buffalo

Mill Operations at 85 to 90 Per Cent—Blast Furnace Scrap Strong

BUFFALO, Jan. 5.—The market is quiet with the holiday lull still making its presence felt. Inquiries for the current week probably do not total more than 1000 tons, but producers, without exception, feel that the general situation is very good. Most furnaces are asking $22, base, for their first quarter iron, though $21 can still be done on foundry and malleable and $20.50 on basic. Silicon differentials are being sought and obtained, and there is no apparent reason for antici-

pating a weakening of prices at this time. Fifteen furnaces are in blast in this district.

We quote prices f.o.b. gross ton, Buffalo, as follows:

No. 2 plain, sil. 1.75 to 2.25	$21.00 to $22.00
No. 2X foundry, sil. 2.25 to 2.75	21.50 to 22.50
No. 1 foundry, sil. 2.75 to 3.25	22.50 to 23.50
Malleable, sil. up to 2.25	21.00 to 22.00
Basic	20.50 to 21.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—The market for all kinds of material continues good. The warehouse interests report that business in the last three months of 1925 was the best of any equal period in the year. The demand, particularly for small bars and sheets, held up throughout the holiday period and brisk buying is expected this month. The Seneca Iron & Steel Co., after a partial shutdown for a couple of days for repairs, has resumed operations at close to 100 per cent. The bar market is strong and shapes are fairly steady. Wire business is good and the demand for semi-finished steel keeps up. Mill operations here average between 85 and 90 per cent.

Warehouse prices are being quoted as follows: Steel bars, 3.30c.; steel shapes, 3.40c.; steel plates, 3.40c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, 4.60c.; No. 28 galvanized, 5.75c.; cold-rolled shapes, 4.45c.; cold-rolled rounds, 3.95c.; wire nails, 3.90c.; black wire, 3.90c.

Old Material.—Very little buying has taken place in the holiday period, but the situation is strong and dealers are looking for heavy buying by two of the local consumers this month. A third is expected to be in the market around the first of February. A local mill which has been buying heavy melting all through the early part of the winter at $18, is still able to purchase small lots at this price, but its consumption of scrap is said to have been so heavy over the past six weeks that it may soon be necessary for it to come into the market for a tonnage. For large tonnages dealers say mills will pay at least $18.50, and probably $19 to $19.50. The market has grown firmer on cast iron borings and mixed borings and short turnings, with the prices now ranging from $14 to $14.50. There has been a little buying of these grades, some of it by outside consumers at Youngstown and Pittsburgh. This, coupled with the fact that consumption is increasing with better blast furnace operations and production has fallen off over the holiday period, has stiffened the market on this class of material. Railroad lists of the Pennsylvania and New York Central are due to close this week and bids are expected to be better than market prices. Dealers look for a very busy first quarter and a brisk half. Stocks of dealers and consumers alike are light.

We quote prices f.o.b. gross ton, Buffalo, as follows:

Heavy melting steel	$18.50 to $19.00
Low phosphorus	20.00 to 21.00
No. 1 railroad wrought	16.50 to 17.00
Car wheels	17.50 to 18.00
Machine shop turnings	13.50 to 14.00
Mixed borings and turnings	14.00 to 14.50
Cast iron borings	14.00 to 14.50
No. 1 busheling	17.50 to 18.00
Stove plate	15.00
Grate bars	14.50 to 15.00
Hand bundled sheets	13.00 to 13.50
Hydraulic compressed	17.50 to 18.50
No. 1 machinery cast	17.50 to 18.00
Railroad malleable	20.00 to 21.00
No. 1 cast scrap	17.50 to 18.00
Iron axles	26.00 to 27.00
Steel axles	20.00 to 21.00

Great Northern Inquiries for Shop Equipment

The Great Northern Railway Co., F. A. Bushnell, purchasing agent, St. Paul, Minn., has sent out inquiries for the following shop equipment: One 44-ft. electric drive air compressor; one 16-in. x 60-in. riveted air receiving tank; one forge complete similar to Royal No. 100 with No. 2 hood; one combination press similar to Champion combination No. 32-B, 42-in., 32-ton with high-speed arbor press and straightening attachment; one Peerless universal high-speed shaping saw; one Cincinnati type FTA heavy duty floor grinder; one Rapidayton dual cylinder, continuous discharge gasoline pump; two 1-gal. oil pumps; two 550-gal. oil tanks, 36 x 44 x 87 in.

New York

Heavy Steel Specifications and Some First Quarter Contracting

NEW YORK, Jan. 5.—The last week of 1925 brought heavy specifications on fourth quarter steel contracts and some belated contracting for first quarter, altogether one of the best weeks of the year for local sales offices of some of the steel companies. Since New Year's Day there have been no important market developments, but both steel companies and their customers look with confidence upon the outlook for first quarter. The attitude of buyers seems to indicate no expectation of a rise in prices, at least during the first three months of the year, nor is there expectation that prices will go lower. The prospect of price stability gives the market outlook a certainty it did not have at the beginning of 1925. Bids received by the New York Central Railroad last week on several thousand tons of miscellaneous steel products, but principally plates, shapes and bars, disclosed no new price trend, although some mills made the usual concession of delivery at points on the line of the road at prices equivalent to the Pittsburgh base. Two such delivery points on which Pittsburgh prices were named are Youngstown and West Seneca, N. Y. Just prior to the close of the year a number of fair-sized structural projects were closed, but the number of new projects up for bids has been diminished by holiday activities. There is a lull in buying of railroad equipment, which is believed to be but temporary, as several large projects are in the offing, including 6000 to 10,000 cars for the Chesapeake & Ohio, the inquiry for which will probably be issued soon.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.34c. to 2.44c.; plates, 2.09c. to 2.14c.; structural shapes, 2.24c. to 2.34c.; bar iron, 2.24c.

Pig Iron.—Despite year-end inventories and the holiday, sales of pig iron in this district during the past week totaled 5000 tons. While there are a few sales of spot iron, demand is largely for tonnage to fill in first quarter requirements. There is little interest as yet in iron for second quarter delivery. Melters are showing less concern over the possibility of an advance in prices. Coke, it is believed, is more likely to decline than advance, if it changes in price at all, and the competition of foreign iron is counted on to act as a check on prices of domestic furnaces. Domestic quotations have remained unchanged during the week and foreign iron continues to range from $21.50 to $22.50, duty paid port of entry.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.54 from Virginia:

East. Pa. No. 2, sil. 1.75 to 2.25	$25.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	$25.52 to 26.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	26.02 to 26.52
Buffalo, sil. 1.75 to 2.25	25.91 to 26.91
No. 2 Virginia, sil. 1.75 to 2.25	29.54

Warehouse Business.—Considering the time of year, there has been a good movement of steel from warehouse. With the exception of antimony, prices given on page 122 are unchanged.

Cast Iron Pipe.—The first week of the new year has been unusually quiet in cast iron pipe. There have been no municipal lettings of importance. Prices are unchanged.

We quote pressure pipe per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $50.60 to $52.60; 4-in. and 5-in., $55.60 and $57.60; 3-in., $65.60 to $67.60, with $5 additional for Class A and gas pipe. Discounts both of Northern and of Southern makers of soil pipe, f.o.b. New York, are as follows: 6-in., 42½ to 43¼ per cent off list; heavy, 52½ to 53¼ per cent off list.

Old Material.—There is moderate buying activity in some grades of scrap, but the lack of interest among consumers leaves the market in a rather aimless posi-

tion. Prices are unchanged, but are steady. Brokers look for a resumption of mill buying soon.

Buying prices per gross ton, New York, follow:

Heavy melting steel (yard)	$11.75 to $12.25
Heavy melting steel (railroad or equivalent)	13.50 to 14.00
Rails for rolling	14.50 to 15.00
Relaying rails, nominal	23.00 to 24.00
Steel car axles	20.50 to 21.50
Iron car axles	24.50 to 25.00
No. 1 railroad wrought	14.50 to 15.00
Forge fire	10.50 to 11.50
No. 1 yard wrought, long	14.00 to 14.50
Cast borings (steel mill)	10.25 to 11.25
Cast borings (chemical)	14.00 to 14.50
Machine shop turnings	10.75 to 11.25
Mixed borings and turnings	10.75 to 11.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.25 to 12.75
Stove plate (steel mill)	10.25 to 10.75
Stove plate (foundry)	12.00 to 12.25
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	16.50 to 17.50
Cast iron car wheels	14.00 to 14.50
No. 1 heavy breakable cast	14.00 to 15.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$18.50 to $19.00
No. 1 heavy cast (columns, building material, etc.), cupola size	17.00 to 17.50
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 16.50

Ferroalloys.—Orders for only carload and small lots of ferromanganese and of spiegeleisen are noted during the week. Prices are firm and unchanged. So far as known, the inquiry for 600 tons, noted last week, has not been satisfied. Production of ferromanganese in December, according to THE IRON AGE blast furnace statistics, was 26,072 gross tons, the largest for any month last year. This brings the total output for 1925 to 252,632 tons, compared wtih 204,909 tons in 1924. The spiegeleisen output last month was also the largest for the year at 7756 tons, making the 1925 total 65,761 tons, as compared with 107,132 tons in 1924.

Chicago Iron and Steel Market

(*Concluded from page* 84)

with railroad work. The Pennsylvania is offering 38,000 tons. A list issued by the St. Paul totals 5500 tons and one from the Burlington 6000 tons.

We quote delivered in consumers' yards, Chicago and vicinity, all freight and transfer charges paid for all items except relaying rails, including angle bars to match, which are quoted f.o.b. dealers' yards:

Per Gross Ton

Iron rails	$18.00 to $18.50
Cast iron car wheels	18.00 to 18.50
Relaying rails, 56 lb. to 60 lb.	25.00 to 26.00
Relaying rails, 65 lb. and heavier	26.00 to 31.00
Forged steel car wheels	18.50 to 19.00
Railroad tires, charging box size	19.00 to 19.50
Railroad leaf springs, cut apart	19.00 to 19.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	18.50 to 19.00
Heavy melting steel	15.25 to 15.50
Frogs, switches and guards, cut apart	17.00 to 17.50
Shoveling steel	15.25 to 15.50
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheets	13.50 to 14.00
Axle turnings	15.00 to 15.50
Steel angle bars	18.00 to 18.50
Steel knuckles and couplers	18.00 to 18.50
Coil springs	19.00 to 19.50
Low phos. punchings	17.25 to 17.75
Machine shop turnings	9.25 to 9.75
Cast borings	13.50 to 13.75
Short shoveling turnings	13.25 to 13.75
Railroad malleable	18.00 to 18.50
Agricultural malleable	16.50 to 17.00

Per Net Ton

Iron angle and splice bars	16.50 to 17.00
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	17.50 to 18.00
No. 1 busheling	12.00 to 12.50
No. 2 busheling	9.25 to 9.75
Pipes and flues	11.00 to 11.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 machinery cast	17.00 to 17.50
No. 1 railroad cast	16.25 to 16.75
No. 1 agricultural cast	16.25 to 16.75
Locomotive tires, smooth	16.50 to 17.00
Stove plate	14.75 to 15.25
Grate bars	14.00 to 14.50
Brake shoes	13.00 to 13.50

EUROPEAN STEEL

Demand Better in Some Lines—Floods Cripple Belgium—Prices Tend Upward

(By Cablegram)

LONDON, ENGLAND, Jan. 4.

IRON and steel markets generally are still under the holiday influence, Scotland remaining idle all this week. Cleveland iron is firm at recent raised levels, but export demand is still poor. Hematite is strong, on home and export demand, and supplies are scarce.

Foreign ore is dull. Bilbao Rubio is held at about 21s. to 21s. 6d. ($5.09 to $5.21), c.i.f. Tees.

There is improved domestic demand for finished steel, maintained in structural and engineering branches, but new shipbuilding is still inactive. Clyde launchings last year consisted of 280 vessels aggregating 523,322 tons gross register.

Sheets and Tin Plate

Tin plate is quiet and easier. Some works being short of rollings, the makers have accepted 19s. 6d. ($4.73) basis, IC, f.o.b. works port.

Galvanized sheets are firm with makers well sold, but demand is restricted.

Black sheets are quiet. There is some small demand to Japanese specifications, but few actual orders.

On the Continent of Europe

Continental markets are strong, on moderate British demand. Semi-finished steel, especially, is wanted, but supplies are restricted. Sheet bars are being sold at £4 14s. 6d. ($22.92), f.o.b., March delivery.

The supply position is likely to be interfered with seriously by floods in Belgium. The Société Anonyme des Acieries d'Angleur, Sociétée Anonyme John Cockerill, Société Anonyme d'Ougré-Marihaye and Société Anonyme Usines Metallurgiques du Hainaut already have had to stop operations. Latest reports state that the waters are subsiding in the industrial area, but great damage has been done.

Price Changes

Changes in prices are as follows: In Great Britain, East Coast mixed numbers up 1s. to 76s. 6d. to 77s. ($18.31 to $18.43); ship plates down 2s. 6d. to £7 2s. 6d. to £7 12s. 6d. (1.54c. to 1.65c. per lb.); tin plate weaker at 19s. 6d. to 19s. 9d. ($5.73 to $5.79) per base box; Durham coke up to 22s. 6d. ($5.45). Continental prices: merchant bars higher at £5 8s. to £5 10s. (1.17c. to 1.19c. per lb.); ⅛-in. sheets (or plates) up to £6 7s. 6d. to £6 12s. 6d. (1.39c. to 1.43c.).

Dullness in Scrap at Detroit

DETROIT, Jan. 5.—Recent lettings by the largest producers of waste material for January delivery show that no advances are imminent. There has been practically no further buying, so that the market has a general tone of dullness. Old orders are sufficient to absorb material that is coming out and dealers are showing no inclination to offer their yard stocks at present.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting and shoveling steel	$14.75 to $15.25
Borings and short turnings	11.50 to 12.00
Long turnings	10.75 to 11.25
No. 1 machinery cast	17.00 to 18.00
Automobile cast	23.00 to 24.00
Hydraulic compressed	13.75 to 14.25
Stove plate	13.50 to 14.50
No. 1 busheling	13.25 to 13.75
Sheet clippings	9.50 to 10.00
Flashings	12.00 to 12.50

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
Dec.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
28.....	14.25	13.87½	62.87½	9.25	9.00	9.02½	8.67½
30.....	14.25	13.87½	63.37½	9.25	9.00	9.02½	8.67½
31.....	14.25	13.87½	63.75	9.25	9.00	9.02½	8.67½
Jan.							
4.....	14.25	13.87½	63.62½	9.25	9.00	9.02½	8.67½
5.....	14.25	13.87½	63.25	9.25	9.00	9.02½	8.67½

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Jan. 5.

A feeling of confidence, as the new year opens, pervades all the markets. Prospects are excellent for firm or expanding prices and for excellent demand. The copper market is quiet but firm. Demand for tin is light, with prices steady. Demand for lead is good and quotations are firm. Practically no change characterizes the zinc market.

Copper.—Although the year begins with demand for copper light and with prices at comparatively low levels, the outlook is considered propitious by leading producers. This feeling is based largely on the statistical situation. Stocks of refined copper at the beginning of the month were less than one-half of what they were on Jan. 1, 1925. Production is regarded as under satisfactory regulation at present and shipments into consumption last year were 130,000,000 lb. larger than in 1924 and constitute a record. With the first three days of the month practically holidays, very little business has been contracted so far this year. One company yesterday purchased 1500 net tons. It is stated, however, that potential orders are in large volume and that prospects for copper consumption are excellent. Word comes from some mills that orders for their product during the Christmas holidays were the largest of the year. Electrolytic copper is quoted and is selling at 14.12½c., delivered, with some producers asking 14.25c. Lake copper is quoted at 14.25c., delivered.

Copper Averages.—The average price of Lake copper for the month of December, based on daily quotations in THE IRON AGE, was 14.25½c. The average price of electrolytic copper was 13.82½c., refinery, or 14.07½c., delivered.

Tin.—The closing days of the year were only moderately active and those so far this year have been practically stagnant. On Dec. 28, 75 tons was sold and on the following day 50 tons, but on Dec. 30 the market was quite active, 500 tons having been sold with dealers and consumers taking practically equal shares. On Dec. 31, and also yesterday and today, the market has been exceedingly dull. It is believed that consumers still have much tin to purchase for January-February delivery. Deliveries into consumption in the United States at 6160 tons in December were larger than expected. Stocks as of Dec. 31 were 2654 tons. At the end of December there was a decrease in the world's visible supply of tin of 175 tons from November, the total on Jan. 1 being 18,024 tons. Spot Straits tin today was quoted at 63.25c., New York. Prices in London today were about £1 per ton less than a week ago, with spot standard quoted at £288, future standard at £281 7s. 6d. and spot Straits at £289. The Singapore price was £287. Arrivals thus far this month have been 900 tons with 5635 tons reported afloat.

Lead.—The market is quiet and firm and producers are nearly fully booked for their January output. This is indicated by the fact that attempts to buy prompt lead have not been easily successful. The quotation of the leading interest continues unchanged at 9.25c., New York, as its contract price. Quotations in the outside market range from 9c. to 9.20c., St. Louis.

Zinc.—Conditions in this market are practically unchanged from those existing at the close of the year. Prime Western zinc for early delivery is still scarce. The quotation for prompt shipment is easily 8.75c., St. Louis, and sellers state that they would not take less than 8.70c., St. Louis, for January. Deliveries for the early part of January command a higher premium than for the end of the month, which can probably be covered at 8.65c., St. Louis. We quote the market for early delivery at 8.65c. to 8.70c., St. Louis, or 9c. to 9.05c., New York. Demand is reported as light.

Nickel.—Wholesale lots of ingot nickel are quoted unchanged at 34c. with shot nickel at 35c. and electrolytic nickel at 38c. per lb.

Antimony.—The scarcity of Chinese metal is more pronounced and spot and January delivery is quoted at 25c., New York, duty paid, with February delivery at 24.75c. and December-January shipments from China at 24.50c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 28c. per lb., delivered.

Old Metals.—The market is firm. Dealers' selling prices, in cents per lb., are as follows:

Copper, heavy and crucible	13.75
Copper, heavy and wire	13.00
Copper, light and bottoms	11.75
Heavy machine composition	10.00
Brass, heavy	9.00
Brass, light	8.00
No. 1 red brass or composition turnings	9.25
No. 1 yellow rod brass turnings	9.50
Lead, heavy	8.25
Lead, tea	7.00
Zinc	5.75
Cast aluminum	22.00
Sheet aluminum	22.00

Chicago

JAN. 5.—Copper, zinc and antimony are unchanged. Lead has advanced slightly in a fairly strong market, characterized by a substantial volume of buying. Tin is quoted somewhat higher in a market which is firm and which is strongly influenced by the foreign situation. Old metals are quiet and unchanged. We quote, in carload lots: Lake copper, 14.25c.; tin, 64c.; lead, 9.25c.; zinc, 8.80c.; in less than carload lots, antimony, 24c. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.25c.; red brass, 9c.; yellow brass, 8c.; lead pipe, 8c.; zinc, 5.25c.; pewter, No. 1, 37c.; tin foil, 44c.; block tin, 52c.; all being dealers' buying prices for less than carload lots.

Non-Ferrous Rolled Products

No change has been made in the quotations on brass and copper rolled products since those of Dec. 16. Zinc and full lead sheets also are unchanged. For New York warehouse prices see page 132.

List Prices Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight Up to 75c. Per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets	
High brass	19⅛c.
Copper, hot rolled	22½c.
Zinc	12c.
Lead (full sheets)	13c.
Seamless Tubes	
High brass	23¾c.
Copper	24½c.
Rods	
High brass	16¾c.
Naval brass	19⅝c.
Wire	
Copper	16¼c.
High brass	19⅝c.
Copper in Rolls	21⅜c.
Brazed Brass Tubing	27⅛c.

New Sanitary Can Prices for Eastern and Central States

The American Can Co., New York, announces the following term contract price, f.o.b. factory, for standard size sanitary cans for the Eastern and Central parts of the United States, effective Jan. 2, 1926:

Size No.	New Price Per M	Reduction of Per M
1.....	$15.30	$0.75
2.....	21.34	1.00
2½.....	26.91	1.75
3.....	29.09	1.00
10.....	64.08	2.00

FABRICATED STEEL

Awards Total 31,000 Tons in the Past Week with 11,500 Tons Pending

The total of structural steel awards in the past week was 31,000 tons, which included several jobs in New York exceeding 2000 tons each. During the holiday period very little new work has come up for bids. The principal awards follow:

Roxy Theater, Seventh Avenue and Fiftieth Street, New York, 3400 tons, to Levering & Garrigues Co.

Bricken apartment building, Park Avenue and Eighty-eighth Street, New York, 1000 tons, to Hay Foundry & Iron Works.

Apartment building, 303 West Eighty-sixth Street, New York, 425 tons, to Paterson Bridge Co.

Apartment building, West Ninetieth Street, New York, 250 tons, to Paterson Bridge Co.

Harper Organization, office building at Lafayette and Duane Streets, New York, 3200 tons, to McClintic-Marshall Co.

Art gallery, 556-58 Fifth Avenue, New York, 260 tons, to Post & McCord.

Apartment building, Broadway and 104th Street, New York, 1000 tons, to George A. Just Co.

Broadway Temple, 173rd and 174th Streets and Broadway, New York, 1200 tons, to George A. Just Co.

Hotel, 119-123 West Seventy-second Street, New York, 600 tons, to Harris Structural Steel Co.

Bing & Bing, apartment building, Fifty-sixth Street, New York, 2150 tons, to A. E. Norton, Inc.

Burrell Building, 173 Madison Avenue, New York, 300 tons, to Hedden Iron Construction Co.

Office building, 70-76 Trinity Place, New York, 1900 tons, to Hedden Iron Construction Co.

Telephone building, Flushing, Long Island, 300 tons, to Hedden Iron Construction Co.

Weirton Steel Co., Weirton, W. Va., open-hearth plant extension, 3600 tons, to American Bridge Co.

Maccabees Building, Detroit, 1150 tons, to American Bridge Co.

Palace Theater, Canton, Ohio, 400 tons, to American Bridge Co.

Theater, New Haven, Conn., 300 tons, to Berlin Construction Co.

Court House and City Hall, Newport, R. I., 225 tons, to an unnamed fabricator.

Shed, New Haven, Conn., 125 tons, to Berlin Construction Co.

Unitarian Building, Boston, 100 tons, to New England Structural Co.

Rhode Island College of Education, Providence, R. I., 100 tons, to an unnamed fabricator.

U. S. Engineer's Office, Louisville, steel sheet piling for dams Nos. 46, 50, 52 and 53, Ohio River, 2100 tons, to Carnegie Steel Co.

Western Hills high school, Cincinnati, 350 tons, to L. Schreiber & Sons Co., Cincinnati.

Union Pacific, miscellaneous bridge work, 1425 tons, to American Bridge Co.

Dickmann Realty Co., St. Louis, office building, Grand Boulevard and Gravois Avenue, 200 tons.

Key System Transit Co., Oakland, Cal., two ferries, 2400 tons, to Moore Dry Dock Co., Oakland.

California National Bank, Sacramento, Cal., 300 tons, to Palm Iron Works, Sacramento.

United States Engineer's Office, San Francisco, shore pipe, 110 tons, to Pacific Coast Engineering Co., Oakland.

Shell Oil Co., San Francisco, tanks at Martinez, Cal., 400 tons, to Western Pipe & Steel Co. of California.

San Joaquin Light & Power Co., Fresno, Cal., penstock, 1500 tons, to Ferrum Co. of Germany.

Celite Products Co., Lompoc, Cal., 300 tons, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

New York subway work in Borough of Queens, 1200 tons; bids close Jan. 11.

Nurses' Home, Johns Hopkins Hospital, Baltimore, 500 tons.

Lehigh Valley Railroad, four bridges, 300 tons.

Theater, store and lodge building, Attleboro, Mass., 200 tons.

U. S. Engineer's Office, Louisville, bear-trap leaves for dams Nos. 45 and 46, Ohio River, 620 tons; McMyler-Interstate Co., Cleveland, low bidder.

City of Mobile, Ala., highway bridges, 3500 tons.

State of Washington, two highway bridges, 3000 tons.

High school, Jackson, Mich., 700 tons.

Garfield school, Oakland, Cal., 250 tons.

Bridges over Gillespie dam, Arizona, 1000 tons.

Southern Pacific Co., San Francisco, plates, 230 tons.

REINFORCING STEEL

Awards Exceed 2400 Tons and Pending Projects Total 1120 Tons

Concrete reinforcing bar awards during the week totaled 2429 tons, as reported to THE IRON AGE. New jobs up for bids total 1120 tons. Awards follow:

St. Leo high school, Seventy-ninth and Peoria Streets, Chicago, 180 tons of rail steel, to Olney J. Dean & Co.

Chicago, Rock Island & Pacific Railway Co., bridge construction, Chicago, 200 tons, to Concrete Engineering Co.

Illinois Bell Telephone Co., Merrimac Exchange, Chicago, 130 tons, to Jones & Laughlin Steel Corporation.

Boulevard-Temple Building, Detroit, 260 tons, to McRae Steel Co., Detroit.

Jonas Building, Fifty-eighth Street and South Park Avenue, Los Angeles, 253 tons, to an unnamed jobber.

Auto Sales & Service Co., Twenty-first Street, Los Angeles, 236 tons, to an unnamed local jobber.

General Electric Co., Fifty-third Street and Santa Fe Avenue, Los Angeles, 320 tons, to American System of Reinforcing.

National Grocery Co. building, Jersey City, 700 tons, to Joseph T. Ryerson & Son.

Approaches to New Jersey vehicular tunnel, 150 tons, to Day & Goater, New York.

Projects Pending

W. S. Tyler Co., factory, Cleveland, 300 tons.

Baseball stadium, Newark, 100 tons; general contract awarded to T. J. Scully, Newark.

High Bridge over Harlem River, New York, 100 tons; P. T. Cox Contracting Co., 154 Nassau Street, New York, low bidder on general contract.

Section of New York subway, 150 tons; Booth & Flinn, Ltd., New York, low bidder on general contract.

Section of New Jersey vehicular tunnel, 320 tons; subcontract awarded to J. Kresse Co., 52 Vanderbilt Avenue, New York.

Good Samaritan Hospital, Cincinnati, 150 tons; general contract to Ferro Concrete Construction Co.

RAILROAD EQUIPMENT

Market Quiet But Several Inquiries May Be Closed Soon—Car Orders Totaled 1575

There have been no developments of importance over the year-end in the railroad equipment field. Several small orders aggregate 1575 cars. Two or three inquiries previously reported may be closed soon and further inquiries are expected by car builders within a week or two. The principal items of the week follow:

The Rodger Ballast Car Co. has ordered 250 convertible ballast cars from the American Car & Foundry Co.

Allen & Garcia have ordered 90 mine car bodies from the American Car & Foundry Co.

The Mobile & Ohio has ordered 500 automobile cars from the American Car & Foundry Co.

The Missouri Pacific has ordered 18 passenger, baggage, mail and club cars from the American Car & Foundry Co. and is inquiring for 50 gondola cars.

The Illinois Central placed 400 automobile box cars with the American Car & Foundry Co. and 400 with the Pullman Car & Mfg. Corporation.

The Chicago & North Western placed 25 ballast cars with the Rodger Ballast Car Co.

OBITUARY

EDWIN G. RUST, whose death was briefly noted in THE IRON AGE Dec. 31, had wide experience in the steel industry as an engineer and executive. Starting as a machinist's helper he occupied the positions of machinist, draftsman, chief draftsman, master mechanic, chief engineer, general superintendent, vice-president and president in the iron and steel industry. Among the companies he served were the Carnegie Steel Co., Colorado Fuel & Iron Co., Indiana Steel Co., Jones & Laughlin Steel Corporation, Elk Rapids Iron Co., Rust Boiler Co., the Koppers Co., and the Youngstown Sheet & Tube Co., with which latter company he was connected at the time of his death. He was the inventor of the Rust water tube boiler, and he organized the Rust Boiler Co. of Pittsburgh, which was later sold to the Babcock & Wilcox Co. He was born at "Rockland," the family home near Leesburg, Va., Oct. 1, 1869. He worked his way through Lehigh University, graduating as a mechanical engineer in 1894. During the Spanish-American War he served in the United States Navy as past assistant engineer with the rank of junior lieutenant. During the World War, he served in the production department of the Emergency Fleet Corporation.

EDWIN G. RUST

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CHARLES A. HAINES, for more than 50 years prominently identified with the New England iron and steel trade, and for an equal period associated with the Dodge-Haley Co., Boston and Cambridge, died on Dec. 22 at the home of his daughter-in-law, Mrs. Robert Haines, Melrose, Mass. Mr. Haines, familiarly known in the steel trade as "Pop," was a native of South Boston, was in his seventy-first year, was president New England Iron and Hardware Association, grand secretary United Commercial Travelers' Association and was identified with various organizations. In his early days the Dodge-Haley Co. was the largest importer of Norway iron in this country, and Mr. Haines' territory, as salesman, included "the United States."

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HARTWELL A. TAYLOR, sales manager P. & F. Corbin division, American Hardware Corporation, New Britain, Conn., is dead, in his forty-second year. He was a native of Richmond, Va. For a time he was in the hardware business in the South and then joined the American Hardware Corporation. Leaving that organization he became secretary of the Manufacturers' Bureau, New York. About five years ago he returned to the New Britain concern.

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AUSTIN FARRELL, manager blast furnace department Cleveland-Cliffs Iron Co., Cleveland, died Dec. 25 at his home in Marquette, Mich., at the age of 64. Mr. Farrell was born in Philadelphia. He attended Lehigh University and Lafayette College, having been graduated from the latter in 1880. Mr. Farrell was chemist for the Missouri Furnace Co., St. Louis, for three years and then chemist and assistant superintendent at the furnace of E. & G. Brooke Iron Co., Birdsboro, Pa. Later he was superintendent at other blast furnaces. He became associated with the Cleveland-Cliffs Iron Co. in 1892 as manager of the furnace at Negaunee, Mich. Under his supervision the company built a blast furnace and chemical plant at Gladstone, Mich., in 1895. In 1903 the company's Marquette furnace and chemical plant were built, also under Mr. Farrell's direction, and he retained supervision over both furnaces until his last illness. It was under his supervision that the chemical plants were built at the two furnaces to make wood alcohol and other products by the utilization of the by-products of the coke ovens. Mr. Farrell was a member of the American Institute of Mining and Metallurgical Engineers, the Lake Superior Mining Institute and of various other organizations.

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CHARLES A. DUCHARME, until two weeks ago president Michigan Stove Co., Detroit, now merged with Detroit Stove Works, died Dec. 28 at the age of 67. He was born in Detroit Sept. 22, 1858, son of Charles DuCharme, founder of the Michigan Stove Co. His business career began as a clerk in his father's employ. Later he became successively purchasing agent, secretary, second vice-president and, in February, 1920, president. He was a director of the Union Trust Co., Peoples State Bank, Detroit Fire & Marine Insurance Co. and the Ireland & Matthews Mfg. Co., the latter one of the largest stamping and screw machine product companies in Detroit, the output being largely automotive. One son, Charles B. DuCharme, is secretary of the merged organization, Detroit-Michigan Stove Co., Detroit.

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JOHN KIRBY, JR., president of the National Association of Manufacturers for four years, died Tuesday, Dec. 22, at his home at Dayton, Ohio, where he had extensive interests in industrial corporations. He was president of the Dayton Mfg. Co., director of the Dayton Autograph Register Co., the Kinnard Mfg. Co. and the American Pure Coffee & Spice Co., all of Dayton, and he was also president and director of the United States Headlight Co., Buffalo, and a director in other corporations. He was a charter member of the National Industrial Conference Board and at one time a member of the administrative council of the National Metal Trades Association. His various activities and his outspoken advocacy of "open shop" principles in American industry won for him a wide reputation in industrial circles. He was born May 16, 1850, at Troy, N. Y., and after a common school education there he worked in a stove plant tapping nuts. Leaving Troy in 1867 he went to Grand Rapids, Mich., where he entered the employ of an older brother who was engaged in the manufacture and repairing of jewelry. In 1869 he accepted a position with the Illinois Mfg. Co., engaged in the manufacture of railroad car hardware. He made one or two other changes but returned to the Illinois Mfg. Co. in charge of its lamp department and remained there until 1874, when he unsuccessfully embarked in the manufacturing business for himself. In 1875 he went to Cincinnati to become superintendent of the factory of Post & Co., railroad supply and car hardware manufacturers, and he remained there seven years, during which time the business grew to large proportions. In January, 1883, he organized the Dayton Mfg. Co., of which he was at first a director and general manager but later president, which position he retained up to the time of his death. For many years prior to 1901 organized labor dominated the industrial establishments of Dayton, the plant of the Dayton Mfg. Co. being the only one free from such domination. In 1889, however, labor succeeded in organizing one of the departments and the output fell off 50 per cent and all in the department were discharged, thereby precipitating a bitter struggle, accompanied by riots and assaults, which lasted for about 18 months.

JOHN KIRBY, JR.

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RICHARD E. BEBB, chairman of the board of directors of the Central Steel Co., Massillon, Ohio, died Jan. 5 at the University Hospital, Philadelphia, aged 55.

Business Outlook

(*Concluded from page* 69)

thing, they are somewhat below parity and that readjustments will take the form of moderate increases may, therefore, be reasonably expected.

It is estimated that 1925 earnings, in spite of low prices, will average close to the level of 1923 and considerably over that of 1924. The trend of earnings in the industry as a whole was distinctly upward at the end of the year.

Expect Gradual Increase in Money Rates

A STUDY of the money market and prices throws light on the 1925 situation and the outlook for the future. During the year just closed the trend of money rates has on the whole been upward, and the year ends with a decidedly firm money market. This is due to the fact that business has on the whole expanded, as is forcibly demonstrated by the large increase in bank debits. Other factors have been the development of gold exports toward the end of the year, the increase in commodity prices, and the extension of credit in the stock market, in real estate speculation and in financing installment sales of numerous commodities.

While money rates have been relatively low throughout the past year and some further temporary ease may be expected early in 1926, a continued gradual rise in the interest rate is to be expected, since the forces mentioned above are still operative. So abundant is our supply of funds, however, that no real stringency is probable in the first half of 1926 and particularly if the present spirit of caution and moderation continues to prevail.

Danger in Over-Selling Consumers

Perhaps the next most striking fact illustrated in the chart is the relatively moderate level of production in basic industries. In 1923 and again in early 1925 the production index ran far above the index of retail and wholesale trade. In the latter part of 1925, however, it was below the retail trade index and but little above wholesale trade—a condition which indicates that there is no general over-production in sight.

We may conclude that at the present time over-production is absent, that retail and wholesale inventories must be reasonable, and that the only danger in the near future is that retail trade may be over-stimulated by the use of credit. It is interesting to reflect that formerly the danger has been that manufacturers would produce more than they could sell and that the retailer would become over-stocked. Now the situation is reversed. Large inventories are held by the manufacturer and, in a sense, by the consumer. The danger is now that the consumer will become over-sold.

The chief danger-spots in the present situation are: 1. The over-extension of credit in real estate, loans on stock exchange securities, and in financing installment sales at retail; 2. The probability that building and automobile activity may decline in the second half of 1926, leading to over-production of the materials consumed in those industries. It seems that, while no serious crisis or major industrial disturbance is necessary, some readjustment may be required later in the year. If caution prevails, however, any recession which occurs need not be severe.

Machine Tool Progress in 1925

(*Concluded from page* 13)

in view of our unquestioned ability to supply, in almost every line, the best which the markets afford.

Good Prospects for 1926—More Readjustment

Machine tool prospects in 1926 are good for at least the first half of the year, and the volume will probably tend to increase until mid-summer. The total volume of metal-working business will be large and, in addition, the farsighted manufacturing executives of the United States, during the recent depression, have persistently substituted more efficient machinery for the equipment of pre-war days. The result is more product with less man power and less floor space. Therefore, the expenditures in the metal-working plants during the next few years will be for machinery, not for bricks and mortar.

Metal-working industries of this country are in a period of readjustment which will be even more evident in 1926 and which must continue until substantially a new form of productivity is established. This may not be generally recognized in the industries affected, even though they are in the very act of making the change. It may be the opinion of individual manufacturers that they are merely maintaining the balance of their plants, or making substitutions of new for old and worn-out tools; but whatever the mental attitude toward the process may be, the fact remains that the movement is now so well under way that there can be no halt until it has reached its natural point of repose.

Competition among metal-working manufacturers is growing keener, and the inefficient manufacturer has less chance than he ever had. The best minds among machine tool users and machine tool producers agree that the opportunities for improvement are by no means exhausted. In some fields they have scarcely been touched. Improved methods, increased efficiency on small lots, as well as on quantity production, are demanded, and the machine tool makers are responding to the demand. No period of machine tool development has offered the opportunity of the present.

Conditions That Will Bring Greater Machine Tool Demand

General conditions for 1926 look better than those at the beginning of 1925. Although the building industry may have reached the saturation point in certain districts, in a country-wide sense it is likely to continue. Railroad equipment will be in demand. The automotive industry is still going strong, and there seems to be plenty of opportunity in that field in commercial vehicles of all kinds. Road machinery and material handling devices will doubtless experience a very heavy demand; in fact, in material handling in all of the industries the rapidity of the change is no less than startling. The country has not yet fully recognized the change which the limitation of immigration is introducing in the field of hand labor. The electrical industry in all its forms, especially in domestic appliances and farm power equipment, and super-power projects, all appear promising. The airplane field will call for improved and increased equipment.

In addition to the normal demand created by good business in these many fields should come, and doubtless will come, the one resulting from the challenge of opportunity to far-sighted executives. Improved metal-working equipments in all forms from the blast furnace and the foundry to the finest product of the machine shop now offer a chance for lessened cost and resulting increased profit margins. These conditions are obvious to all alert metal-working executives. The volume of machine tool demand in 1926 will be determined by the degree to which they are willing to back their observation and judgment by action.

Automobile Plants Lead the Way

The advantages of increasing machine tool efficiency are nowhere more strikingly shown than among automobile producers, and the consequences of failure are also well illustrated in that field.

The leaders in the automotive industry can give us all a lesson in alertness. We acknowledge that in the automotive field action follows thought with startling promptness. The rapid change in conditions in metal-working argues for a more general acceptance of this practice. We owe to Shakespeare the thought that "home-keeping youth hath ever homely wit." The home-keeping youth in the metal-working industry, during 1926, will be an easy mark for his competitor. Only those who can meet the challenge of changing conditions with prompt action toward increased efficiency in equipment and method may be confident of a satisfactory display of profit when the year rolls around to its close.

More Tool Steel Bought By Brand

Use of Specifications Decreases With Growing Realization That Chemical Analysis Is Only Part of the Quality Story

SINCE Taylor and White first developed high-speed steel and astonished the metal-working world by making cuts with a red hot tool, there have been many kaleidoscopic developments in the tool steel business. New alloys by the score have been devised and tested; methods of cutting metal have changed overnight; the chemist has been superseded by the metallurgist; great strides have been made in heat-treating knowledge.

And yet it is still difficult, in many cases, to tell just what makes a tool steel "right" for a certain type of work. Chemical composition has something to do with it, the methods of hammering, reheating, rolling and testing have something to do with it—but it is still a difficult matter to place the finger on this or that item and say, "This makes good tool steel."

There was good tool steel long before there was any analysis specification or any photomicrographs. In those days the salesman went into the shop and did his own missionary work, showing how the steel should be handled and getting the order largely on his personality.

Then came the period which may be somewhat loosely defined as the age of "efficiency." Newly graduated and perhaps overenthusiastic engineers (as well as some who could not claim the title of engineer) rushed into machine shops where experience feared to tread and attempted to remake in thirty days the methods taught by thirty years practical evolution.

Scientific management has outlived the onus of the amateurish performances and management today recognizes pretty generally that the output of a shop is dependent on its tools. Consequently, the tool steel salesman often has to demonstrate his wares from an economic standpoint. But the age of "efficiency" gave way to another phase of tool steel development.

The Era of the Chemist

THIS was the period of the chemist. Sometimes the chemist made his entrance into the tool steel argument by reason of that limited amount of knowledge which is generally recognized as a dangerous thing. Perhaps the boss asked him to suggest a specification and hasty reading produced another "specialist" in tool steels. Then the tool steel maker was deluged with specifications, smothered with questions as to why he did or did not use this or that element and generally made to feel that the method of steel production was entirely secondary to a cut and dried chemical analysis.

Many curious conceptions of steel characteristics got about during that period. There was the belief that the percentage of carbon in the steel was the sole factor which determined the best temperature for hardening any steel, and many others equally removed from the truth.

But with the sudden demand for greatly increased production brought about by the recent war and with a growing realization of the importance of research work done by the scientific investigators who laid the real foundation for the tool steel industry of today, there came a call for specially trained metallurgists.

The modern plant which employs a metallurgist today presents an entirely different problem to the tool steel salesman than the practical man or the "efficiency" man or even the chemist. For the metallurgist there must be scientific reasons and scientific data. So the practical type of salesman is generally supplemented by the metallurgist-salesman.

The practical salesman still calls on the shop which uses rule of thumb methods—and gives it the best steel for its purpose, precisely as the metallurgist recommends a certain steel. Sometimes these practical salesmen are taken from the metal-working shops and given a commercial training; sometimes they are young clerical men who possess a commercial training and are sent out to acquire the practical education. Often the latter are more successful than the man who has spent many years making or using tools.

Quality Now All Important

BUT there is less business being done on personality than ever before, and more on character of the steel. There have been some suggestions in years past for the abolition of tool steel brands, but this agitation is dying out and more sales are made on brand than ever before. One reason may be that there are actually fewer brand names today than some years ago. The manufacturers have themselves partially corrected the situation which causes confusion in the mind of the buyer.

Another reason is that it is generally recognized that it would be impossible to draw up a set of specifications which would satisfactorily gage the difference between the various grades of steel sold. Chemical analysis is only a part of the story. The method of manufacture is quite as important.

It must be admitted that if it were feasible to grade tool steels satisfactorily into six standard specifications which would definitely distinguish one quality from another, such a procedure would make things easier for the purchaser. He would then be fairly sure of the quality he was buying, might have some degree of comparability in connection with prices and might conceivably standardize heat-treating methods.

Brand Names Essential

BUT such a plan is not feasible. Analysis is not a difficult matter to ascertain. Most manufacturers will willingly tell the analysis of their steels, but that is claimed not the same thing as producing the grade of steel turned out by the manufacturer. Moreover, while under the brand policy the custom has been to hold the maker of the steel responsible for performance, this could hardly be done under the analysis-specification plan.

Still more important, it is believed it would wipe out both the incentive for high quality and the quality itself. Given a standard specification, the natural line of sales appeal is to price. When price is the criterion, cost reduction is always of first consideration. There would be no reason for the manufacturer to strive for higher quality, is the added contention, since his steel would be sold on the same basis as any other in the class. It would place a penalty upon such tool steel makers as emphasize the question of quality.

Brand names have been established for many years. The melters, rollers, and other workmen in a tool steel plant have an interest in these brands. The brand is an incentive to maintenance and improvement of manufacturing standards.

In the belief that an alphabetical classification of tool steel brands will be of help to its readers, THE IRON AGE presents the list on the following pages, which has been corrected as of Dec. 1, 1925.

Classified List of Tool Steel Brands

The numbers in the column headed "Maker" refer to the table which will be found on page 99

Trade Name	Type	Elements	Maker
A B C	S	W, Cr	15
Ace Oil Hardening	N		39
Acorn Brand No. 1	C		43
Acorn Extra No. 2	C		43
Acorn Standard No. 3	C		43
Air Hardening	H		2
Air Hardening	S		23
Ajax Drill Rod	C		29
Albany	S	Cr, V	32
Albion	H	W	26
Albion Special	H		26
Aldivan	S	Cr, V	30
Alloy	S		17
Alloy A	S	W, Cr	14
Alloy Hot Die	D		48
Alloy No. 6	S	Cr	34
Algonquin	S	Cr	32
Alocon	S	W, Cr, V	31
Alpha Chisel No. 1	S	W	34
Alpha Chisel No. 2	S	W	34
Alpha Tool	S	W	34
Alto	C		11
Alva Extra	S		13
Alva Special	S		13
Anchor Cold Drawn Tap	H	W	3
Anchor Cold Drawn Threading Chaser	H		3
Anchor Cold Drawn Threading Chaser	C		3
Anchor Cold Drawn Threading Chaser	S		3
Anchor Drill			11
Anchor Tool	C		11
Andard	C	C	18
Anvil Heading Die	S		20
Arapaho	S	Cr	32
Argo	H		27
Arrow	S	Cr, V	30
Arrow Oil Hardening	S		20
Atha Air Hardening	H		13
Atha Non-Shrinkable	N		13
Atlas Double Extra	C		5
Atlas Hot Die	S	W	5
Atlas Chrome Die	S	Cr	5
Atlas	S	W	5
A-W Special	C		21
Balfosteel Brand	C		6
Balfour's Clicker Die Steel	C		6
Balfour's Shoe Die	C		6
B-B Hot Die	S		28
Beaver			11
Beaver High Speed	H	W, Cr, V	11
Bell Brand	C		37
Bell Special	C		37
Best	C		31
Best	N	W, V	31
Best	C		16
Beth. Finishing	S	W	1
Beth. No. 445	S		1
Beth. No. 57	S	Cr, W, V	1
Beth. No. 67	S	Cr, W, V	1
Beth. Tool Room	N	Mn	1
Beth. Tough	S	Cr, V	1
Beth. Special High Speed	H	W, Cr, V	1
Beth. Superior Hollow Drill	C		1
Beth. X	C		1
Beth. XCL	C		1
Beth. X Hollow Drill	C		1
Beth. XX	C		1
Beth. XXX Special	C		1
B-F Acme	C		9
B-F Air Hardening	S		9
B-F Arrestite	N		9
B-F Dumost	S	V	9
B-F Extra	C		9
B-F Extra Special	C		9
B-F High Speed	H		9
B-F Standard	C		9
B-F XX Superior	S		9
B-F Tool	C		9
B-F Unique	S	Cr, V	9
B-F Velvet	S		9
Bit and Jar Steel	S	C, Mn	34
Black Diamond	C		13
Black Diamond Drill			13
Blue Anchor Carbon Drill	C		3
Blue Chip	H	W	21
Blue Label	C		48
Blue Label Special	S		25
B N D	S	Cr	8
Boker Special 847	H	W, V	8
Bolt Die Regular	S	Cr	34
Bolt Die Special	S	W Cr	34
B-6	H		14
Buster Brand	S		12
Carbon Hack Saw	C		13
Carbon Tool	C		34
Carbon Tool Double Extra	S	C, Cr	34
Carbon Vanadium	S	V	34
Carva	S	V	31
Cello Vanadium	N	V	33
Certified Tool Steel	C		22
C. F. S.	D	Cr	30
Champion	H		13
Champion Drill			13
Champion Extra	S		13
Champion Extra Drill			13
Champion Non-Changeable	N		13
Champion Special	S		13
Chippeway	C		28
Choice	S	Cr	46
"Choice" Drill Rods	C		26
Chrome Vanadium	D	Cr, V	23
Chrome Vanadium Die	S		34
Clarite	H		12
Class E	C		2
Class P	C		2
Clear Point	H	W	33
C N Die	S	Cr	8
Cobaltcrom—Magnet Steel	S		15
Cobaltcrom—P R K 33	S	Co, Cr	15
CoCo Turning Steel	H	Co	11
Colona	S		11
Colonial High Speed	H	W, Cr, V	11
Colonial No. 3	S	W	11
Colonial No. 4 Finishing	S	W	11
Colonial No. 6	S	Mn	11
Colonial No. 7	S	V	11
Colonial No. 15 Superior	S	Cr	11
Colonial No. 16 Extra	C		11
Colonial No. 36	S	Cr, V	11
Colonial Special No. 14	C		11
Colonial Tungo	S		11
Colonial Tungstar	S	W	11
Colonial Vanstar	S	V	11
Columbia Double Special	S		12
Columbia Extra	C		12
Columbia Extra Special	S		12
Columbia Special	C		12
Columbia Standard	C		12
Comet	C	C	10
Como	H	Co, Mo	15
Composite	C		8
Condor Special	C		5
Constant	N	Mn	34
Crescent C.H.C. Mining	M		13
Crescent Extra	C		13
Crescent Extra Mining Drill			13
Crescent Mining Drill			13
Crescent No. 2	S	Hot Work	13
Crescent Self hardening	H		13
Crescent Special	C		13
Crescent Tool	C		13
Crown	S	Cr, V	30
Crown Razor	C		39
Crown W	S		39
Crown-W Fast Finishing	S		20
Crucible Cast	C		14
Cruhack	S	W V	27
Cru-Razor	C		39
C. Y. W. Choice	S		21
Dannemora Best Warranted	C		6
Dannemora No. O Finishing	S	W	6
Dannemora Self hardening	S	W	6
Darwin 505	H	W Co	15
Deep Drawing Die	S		47
Denine	S	W, Cr	5
Deo	C	C	8
Deward	N	Mn	5
Diamond Brand	N	Cr	34
Die Blanking	S	Cr, V	34
Die Block	S		12
Die Block A	C	C	34
Die Block B	C	C	34
Die Block C	S	Ni Cr	34
Die Block E	S	W	34
Domestic	C		28
Double Extra	S	Cr	34
Double Special	F	W	13
Double Special	S		23
Double Special Cast	S		13
Double Special Flat Finishing			24
Dreadnought	H		23
Dreadnought	H		24
Drill, Hollow	C	C	34
Dualoy	S	W	18
Durabil	C	C	18
Duranium	H	U	18
Duke-Kidd	C		18
Dukex	S	W	18
Durow Special	S		12
Dutrax	C		18
Duvan	S	Co	18
E. H. W.	S	W	30
Elba	C		32
Electric Brand	C		25
Electrite Cobalt	H	W Co	30
Electrite No. 1	H	W	30
Electrite Uranium	H	W U	30
Electro	H	W Mo	19
Eltun	S		16
Enduro	S		16
E-100 Chisel			14
E. V. S.	S	W, Cr	30
Excelo	S		10
Extra	C		10
Extra	C		14
Extra	C		16
Extra	C		21
Extra Best	C		27
Extra Best Cast	S	Cr, V	48
Extra Carbon	C		30
Extra Punch	S	W	30
Extra Special	C		23
Extra Special			24
Extra Special	C		27
Extra Special	F		27
Extra Special Alloy	S	W	30

Trade Name	Type	Elements	Maker
Extra Standard Tool	C		24
Extra Warranted	C		23
Extra Warranted Cast	C		13
Extra WCS	C		34
Falcon	S	W	5
Fast Finishing	S		10
Fast Finishing	S		16
Fedol	S	Mn, Cr	43
Fearless	H	W	26
Federal American	H	W, Cr, V	43
Federal American	C		43
Federal High Speed	H	W	43
Fedol Oil Hardening	S	Mn	43
Finishing Regular	S	W	34
Finishing Special	S	W	34
Firex	S	Cr, Ni	15
Firth-Sterling Best	C		21
Firth-Sterling Special	C		21
Firth-Stirling J-S Chisel	S		21
Firth-Stirling Triple Die	S		21
Firth-Stirling Meteor	S	W	21
FJAB?	C		35
Fool Proof Alloy Steel			19
4-P Semi High Speed	S	W, Cr, V	14
426	S	W	30
Frasse Temper B Tool Steel	C		22
Gibraltar	C		8
Gold Anchor High Speed Drill	H		3
Gold Label	H	W	48
Grade H	S		22
Gralur	C		18
Green Label	C		48
Green Label Extra	C		25
Griffin Brand	N	Mn	6
G. S. N. Hot Die	S	Cr	30
Gyro	F	W	48
Gysinge			20
Hacksaw	S	W	6
Hacksaw	C		6
Hack Saw Sheet	S		23
H.A.K. Hot Die	S	Cr	31
Halco	S		23
Haleut			23
Hard	C		19
Hargus	S	Mn, Cr	50
Hawk Brand	C		24
Hawk H	S	Cr, V	24
Hawk Special	C		24
Hawk Vanadium	S		24
High Carbon	C		17
High Carbon Alloy	S		28
High Double Extra	H	W, Co, V	34
High Speed	H	W	38
High Speed Extra	H	W, V	34
High Speed Extra Drill	H	W, V	34
High Speed No. Extra	H	W, Mo, V	34
High Speed No. 2	H	W	2
High Speed Sheet	H		23
Hobson's Choice XX	C		26
Hobson's Oil Hardening	S		26
Hobson's Warranted Best	C		26
Hollow Drill			26
Hot Die	S	W	6
Hot Stamping Alloy Die	S		28
H.R.W.	D		16
Huron	S	Cr	32
Hy-Glo Stainless			30
Ideor	D	W, Cr	15
Imperial	F	W	2
Imperial	C		39
Imperial Chrome Vanadium	S		39
Imperial Extra Special	H	W	2
Imperial Special	H	W	2
Imperial Turning and Finishing	S	W	2
Indura	S		39
Intra	S	W	8
Invaro	S		21
Invincible Drill Rod	C		29
Iroquois Special	F	W	32
Jessco	H		28
J J Hot Work	S		28
K-9	N	Cr, V	9
Ketos	N		23
Ketos Oil-Hardening	N		24
Keystone	S		16
Kronos Tool Steel	C		22
Krovan	S		23
Kutkwik	H		16
LaBelle Cold Header Die	S		13
LaBelle Eagle			13
LaBelle Hot Header Die	S		13
LaBelle Paragon	C		13
LaBelle Premier	C		13
LaBelle Standard	C		13
Latrobe	C		46
L. C. T. Alloy			24
L. C. T. Alloy	S		23
LeMoyne Finishing	S	W	31
LeMoyne High Speed	H	W, V, Cr	31
LeMoyne K 760	H	W, Cr, V	31
LeMoyne Non-Shrink	N	Mn	31
Liberty	S		23
Lion Carbon	C		28
Ludlum Carbon	C		32
Lusterite Stainless			30
L-XX	H	W	5
McInnes Special	C		33
Mangano	N	Mn	30
Mansil	N		16
Marathon	S		23
Marvel	S	W, Cr, V	46
Master	N	Mn	18
Maximum High Speed Steel	H		22
Maxite	H		12
Medium Hard	C		19
Meteor	H		39
Mine Drill			16
Miner's Drill	C		28
Miner's Drill	C		28
Minerva	H		2
Minerva Special Chisel	S	Cr	2
Mining Drill			25
Mining Drill			34
Mining Drill			34
Misco "A"	C		33
Mohawk Extra	H	W	32
Mohawk Extrusion	S	W	32
Mohawk Hi Van	H	W	32
Mohawk Hot Die	S	W	32
Monaca	C		38
Monaca Drill Rod	C		38
Monaca Special	C		38
Monarch Chrome Vanadium	S		39
N C S	S	W, Cr	8
Neor	N	Cr	15
New Process Hollow Drill	C		13
NN Die	S	Cr	5
N-3 Nickel	S		39
No. 4 Hot Work	S	Cr	2
No. 5	D	W	2
Non-Shrinkable	N	Mn, W, Cr, V	46
Novo Superior	H	W, V	8
Nut Piercer	S	W, Cr	34
Oil Hardening Shock Resisting	S		28
Ohio	S		11
Oildie	N		12
On	H	Cr, V, W	36
Onplus	H	Cr, V, W, Mo	36
Ontop	H	Cr, V, W, Co	36
Otsego Special	D		32
Panther Special	H	W, Co	5
Para	S	W	14
Paragon	N		13
Par-Exc	S	W, Cr, V	46
Park Circular Saw Plates	C		13
Park Special	C		13
Park Triple Alloy Punch	S		13
P & Co Chrome Magnet	S		39
P & Co Tungsten Magnet	S		39
P. B.	C		37
Peerless	S		23
Peerless	H	W	25
Peerless A	H		13
Peerless Extra	C		13
Pequot	S	V	32
PGT Soderfors Dannemora Best	C		20
PGT Soderfors Dannemora Crown Razor	C		20
PGT Soderfors Dannemora Standard	C		20
PGT Soderfors Dannemora Very Best	C		20
Phoenix	S		12
Pompton	C		32
Potts Extra Special	F		39
Potts Best	C		39
Potts Hollow Drill	C		39
Potts Solid Drill	C		39
Potts Superior	H		39
Pneu Chisel	S		13
Prince	S	Cr	35
P. R. K. 33	S	Cr	30
Pueblo	S	N Cr	32
Punch Steel Special	S	Cr V	34
Purple Cut	S	Mo	32
Pyro	S		23
Pyro Hot Die	S	W, Cr, V	31
Python	S	V	5
Rapid Finishing	S		28
Record "A"	H	W	33
Red Anchor Carbon Drill	C		3
Red Cut Cobalt	H	W, Cr, V, Co	46
Red Cut Superior	H	W, Cr, V	46
Red Label	S	W	2
Red Label	C		48
Red Star	C		11
Red Star Drill			11
Regular Grade	C		6
Regular WCS	C		34
Rekford Extra	H	W	1
Rekord Extra High Speed	H		20
Rekford Superior	H	W	1
Rekord Superior High Speed	H		20
Reliance	C		38
Reliance Drill Rod	C		38
Renown	D	V	30
Rex A	H		13
Rex AA	H		13
Rex AAA	H		13
Ryolite B-F-D	S	Cr, W, V	40
Ryolite Chromium Hot Work	S	Cr C. Va	40
Ryolite Diamond B	C		40
Ryolite 4 Point Chisel	S	C, V, W	40
Ryolite Special High Speed	H	C, Va, W	40
Ryolite Tungsten Hot Work	S	W, Cr, V	40
Ryolite X	C		40
Ryolite XX	C		40
Ryolite XXX	S	V	40
Sanderson's Crucible Steel	C		13
Sanderson's Extra	C		13
Sanderson's Peerless Extra	C		13
Sanderson's Self Hardening	H	W	13
Sanderson's Special	C		13
Sanderson Tool	C		13
Seaco	C		42
Seaco Chrome Vanadium	S	Cr, V	42
Seaco High Speed	H		42
Seaco Hot Die	S	Cr	42
Seaco Non-Shrinkable	N	Mn	42

Trade Name	Type	Elements	Maker
Select	S	Cr	30
Self Hardening	S	W	2
Self Hardening	S	W	8
Self Hardening	S		13
Self Hardening	S		23
Self Hardening	S		48
Seminole	S	W, Cr	32
Seneca	S	W	32
217 Metal	S	Cr, Ni	14
Shock Resisting	S		28
Silcrome	S	Si, Cr	32
S-in-Dannemora Chrome	Magnet steel		20
S-in-Dannemora Tungsten	Magnet steel		20
Silver	C	Cr, Ni	13
Silver Die	S		14
Silver Star	C		21
Simonds Alloy	S		41
Simonds Carbon Tool	C		41
Simonds High Speed	H		41
Simonds Non-Shrinking Die	N		41
Simonds Permanent Magnet	C	W	41
Simonds Self hardening			41
Simonds Special Tool	S		41
Sisco Non-Deforming	N	W	43
Sisco C. N. V.	S	Cr, Ni, V	43
Sisco C. V. R.	S	Cr, V	43
Sisco C. V. S.	S	Cr, V	43
Sisco V. A. S.	S	V	43
S-M	S		10
Soderfors Anvil	S	Mn	1
Soderfors Arrow	S	Mn	1
Soderfors Best	C		1
Soderfors Crane	C		1
Soderfors Crown W	S	W	1
Soderfors Double Crane	C		1
Soderfors Drill	C		1
Soderfors Standard	C		1
Soderfors Tungsten Tap	S		20
Soderfors Very Best	S	Cr	1
Soho Self Hardening	S		26
Soft	C		19
Special	C		10
Special	C		14
Special	S		16
Special	S		19
Special	C		23
Special	H		27
Special	H		28
Special	C		31
Special	S		46
Special Alloy	S	V	14
Special Alloy	S		17
Special Carbon	C		20
Special Cast	C		13
Special Chrome Nickel	D	Cr, Ni	33
Special No. 0	S		48
Special Punch	S	W	30
Special Shell Turning Bits	S		13
Special Tack	S		13
Special Tungsten Alloy	S	W	38
Special Vanadium	S		23
Special Vanadium	S	V	29
Special WCS	C		34
Stag	C		2
Stag Miners Drill			2
Standard	C		16
Standard	C		23
Standard	C		48
Standard Carbon	C		30
Star-Zenith	H		10
Stentor	N	Mn	10
Sterling	C		21
Super-dreadnought	H		23
Super-dreadnought	H		24
Superb	S	Cr, V	30
Superior	C		33
Supreme	S	Cr, V	30
Supremus	H		28
Supremus Extra	H		28
T-K	S		10
Tacony Alloy Die	S		44
Tacony Alloy Tool	S		44
Tacony Alloy Trimmer	S		44
Tacony Bit	C		44
Tacony Carbon (Grades I to XIII)	C		44
Tacony Chisel and Drill	C		44
Tacony Gol Chisel	S		44
Tacony Jar	C		44
Tacony Regular Die	C		44
Tacony Regular Trimmer	C		44
Talon	C		2
Tap Steel Special	S	Cr, V, W	34
Teenax	N		48
Thermo	S		23
Toledo	C		4
Toledo High Speed	H		4
Toledo Non-Shrinking	N		4
Toledo Scimitar	S	W, Cr	4
Toledo Special	C		4
Toledo Superior	C		4
Tool	C		27
Tool Holder No. 1	H	W, Cr	34
Tough	C		19
Tough Hard	C		19
Track Chisel	S		23
Triple Extra	S	Cr, W	14
Triple Extra Die	S	Cr, V	34
Trojan	C		39
Truform	N		28
Truform Special	N		28
Tungsten Hack Saw	S		12
Tunva Special	S	Cr	13
Ultissimus	C		19
Ultra Capital	H	W	6
Ultra Capital, Plus One	H	W, Co	6
United Alloy Steels			45
Unito Drill Rod	C		29
Utica	S	W, Cr	32
Utilitas Carbon	C		28
"V" High Speed	H	V, W	33
V-7 Chisel and Punch Steel	S		14
Valutap	S	W, Cr, V	46
Vanadium	S	Cr, V	46
Vanadium	H	V	33
Vanadium	D	V	27
Vanadium Crucible	S	V	33
Vanadium Hot Work	S		27
Vanadium Potts Best	S		39
Very Hard	C		19

	Name	*Street Address*	*City and State*
1.	George Adams & Son	1302 W. Washington Blvd	Chicago
2.	Edgar Allen Steel Co., Inc.	718-22 W. Lake St.	Chicago
3.	Anchor Drawn Steel Co.		Latrobe, Pa.
4.	John H. Andrew & Co., Ltd.	26 Cortland Street	New York
5.	Atlas Alloy Steel Corp.		Dunkirk, N. Y.
6.	Arthur Balfour Steel Co., Inc.	23-25 Purchase St.	Boston
7.	Bethlehem Steel Corp.		Bethlehem, Pa.
8.	H. Boker & Co.	101 Duane St.	New York City
9.	The Bourne-Fuller Co.	Hanna Building	Cleveland
10.	Carpenter Steel Co.		Reading, Pa.
11.	Colonial Steel Co.	324 Fourth Avenue	Pittsburgh
12.	Columbia Tool Steel Co.		Chicago Heights, Ill.
13.	Crucible Steel Co. of America	17 E. 42nd St.	New York
14.	Cyclops Steel Co.		Titusville, Pa.
15.	Darwin & Milner, Inc.	1260-64 W. 4th St.	Cleveland
16.	Henry Disston & Sons, Inc.	(Tacony)	Philadelphia
17.	Driver Harris Co.		Harrison, N. J.
18.	Duke Steel Co.	191 Pearl St.	New York
19.	Electro Steel Co.	206 Jones Law Bldg.	Pittsburgh
20.	K. Engelsted	114 Liberty St.	New York
21.	Firth Sterling Steel Co.		McKeesport, Pa.
22.	Peter A. Frasse & Co., Inc.	133 Walnut St.	Hartford, Conn.
23.	Halcomb Steel Co.	Geddes St.	Syracuse, N. Y.
24.	Hawkridge Brothers Co.	303 Congress St.	Boston
25.	Heller Brothers Co.	879 Mt. Prospect Ave.	Newark, N. J.
26.	Hobson, Houghton & Co.	83 Beekman St.	New York
27.	John Illingworth Steel Co.	(Frankford)	Philadelphia
28.	Jessop Steel Co.		Washington, Pa.
29.	Kidd Drawn Steel Co.		Aliquippa, Pa.
30.	Latrobe Electric Co.		Latrobe, Pa.
31.	LeMoyne Steel Co.	Park Bldg.	Pittsburgh
32.	Ludlum Steel Co.		Watervliet, N. Y.
33.	McInnes Steel Co., Ltd.		Corry, Pa.
34.	Midvale Co.	(Nicetown)	Philadelphia
35.	A. Milne & Co.	745 Washington St.	New York
36.	Onondage Steel Co., Inc.	James St. and Thompson Rd.	Syracuse, N. Y.
37.	Patriarche & Bell	351 West St.	New York
38.	Pittsburgh Tool Steel Wire Co.		Monaca, Pa.
39.	Horace T. Potts & Co.	East Erie Ave. and D Street	Philadelphia
40.	Joseph T. Ryerson & Son, Inc.	2558 W. 16th St.	Chicago
41.	Simonds Saw & Steel Co.		Lockport, N. Y.
42.	Stulz Sickles Co.	121-123 Lafayette St.	Newark, N. J.
43.	Swedish Iron & Steel Corp.	654 West Lake Street	Chicago
44.	Tacony Steel Co.	Franklin Bank Building, 1417 Sansom Street	Philadelphia
45.	United Alloy Steel Corporation		Canton, Ohio
46.	Vanadium Alloy Steel Co.		Latrobe, Pa.
47.	Vulcan Crucible Steel Co.		Aliquippa, Pa.
48.	Edward T. Ward's Sons Co.	394 Frelinghuysen St.	Newark, N. J.
49.	Wheelock Lovejoy & Co., Inc.		Cambridge, Mass.
50.	Ziv Steel & Wire Co.	4413-4423 W. Kinzie St.	Chicago

Trade Name	Type	Elements	Maker
Viking Extra	S		13
Viking Special	S		13
Vulcan	D	W	47
Vulcan Calo Ferro	S		47
Vulcan Extra	C		47
Vulcan Extra Chrome	S	Cr	
Vulcan Fort Pitt	C		47
Vulcan Hecla	S	Cr, V	47
Vulcan Non-Hardening	S		47
Vulcan Non-Shrinkable	N	Mn	47
Vulcan Regal No. 2	F	W, Cr	47
Vulcan Special	C		47
Vulcan Special Vanadium	S	V	47
Vulcan Special "W"	S	W	47
W. W. S. H.	S	W	30
Wando	N		14
Washington Carbon	C		28
Whelco Alloy Tap	S	C, V, W	49
Whelco Finishing	S	Cr, W	49
Whelco High Speed	H	W	49
Whelco Hot Die	S	Cr	49
Whelco Oil Hardening	N	Mn	49
Whelco Standard	C		49
Whelco Superior	C		49
Whiz Chisel	S		39
Wizard	S	W	50
Wolfram	H	W, Cr V	47
Wolva	S		30
Wortle	D	Mn, W	14
Wortle	D	W	30
Wortle Drawing Die	S		23
Wortle Drawing Die	S		13
X. L. Chisel	S	W	30
Yellow Label Alloy Die	S		25
Ziv's	C		50
Ziv's High Speed	H	W	50
Ziv's Hollow Drill	C		50

TABLE

C—Carbon
S—Special Alloy
H—High Speed
N—Non-deforming
F—Finishing
D—Die Steel

PERSONAL

(*Concluded from page 75*)

Louis F. Vogt, works manager of the Standard Chemical Co., Pittsburgh, producer of radium and alloys of vanadium and uranium, has resigned after a service dating from the beginning of the company's production in 1912. He developed and patented a number of the processes used for radium extraction and for electric furnace production of rare metal alloys. In the 13 years the company made the unique record of producing less than half a pound of an element on substantially continuous operation. But an ounce of radium at the present time is worth approximately $2,065,000, whereas an ounce of gold is worth slightly more than $20. On the other hand, the production of vanadium and uranium alloys is a substantial tonnage matter. The electric furnaces for alloy production at the Standard works were designed by the organization and were the first electric furnaces on the lines of the West Penn Power Co. Mr. Vogt is looking after some personal interests and then intends to take up new activities.

—

T. M. Girdler, general manager, Jones & Laughlin Steel Corporation, Pittsburgh, at a recent meeting of the board of directors was made a director and vice-president in charge of operations.

—

George H. Derbyshire has been appointed sales manager of the Sanitary Co. of America, Linfield, Pa., effective Jan. 1.

—

Henry Sears Hoyt, Chicago branch manager of A. Milne & Co., steel and iron merchants, 741 Washington Street, New York, and James King Hoyt, Jr., sales manager in New York, have been admitted as partners in the firm.

—

Stephen McGovern, who for 10 years was in the St. Louis office of the Matthew Addy Co. and later resident manager of the St. Louis office of the Domhoff & Joyce Co., has joined the sales organization of the Sterling Steel Co., East St. Louis, Ill., manufacturer of small steel castings.

—

George M. Pearse, for many years Western representative of the Brown & Sharpe Mfg. Co., Providence, R. I., has been appointed sales manager of the Union Twist Drill Co., Athol, Mass.

—

W. W. Nichols, mechanical engineer with D. P. Brown & Co., 1440 Park Place, Detroit, manufacturer of belting and transmission appliances, has been appointed assistant to W. R. Brown, who is general manager of the company. Mr. Nichols was recently president of the Detroit chapter of the Society of Industrial Engineers.

Thomas O'Brien, for the past 15 years engineer and sales manager for the John F. Allen Co., 370 Gerard Avenue, New York, manufacturer of portable pneumatic riveting machines, has resigned to go into business for himself.

—

Lewis E. Wallace, assistant district sales manager at Cleveland of the Youngstown Sheet & Tube Co., has been appointed manager of the Detroit office, succeeding Grant W. Bostwick, resigned. Mr. Wallace has served in the sales departments of the company at Youngstown and Chicago in addition to his work at Cleveland.

—

H. Oliver Williams, who has served as an efficiency engineer for the executive department of the Bethlehem Steel Corporation, Bethlehem, Pa., has resigned to become vice-president in charge of sales of the Braeburn Alloy Steel Corporation, Braeburn, Pa. Mr. Williams has been connected with the Carnegie Steel Co. in the Homestead and Duquesne works and later was assistant to James M. Camp, chief of the bureau of instruction, and he was also connected with the general sales department of the Carnegie Steel Co. In 1919 he became assistant manager of the railroad division of the Midvale Steel & Ordnance Co. and went with the Bethlehem organization when the Midvale properties were taken over.

—

John Irwin has been appointed plant engineer, in charge of maintenance, at the Remy Electric Co. No. 3 plant, Muncie, Ind.

—

J. B. Marks has been elected vice-president, in charge of sales, traffic and purchases, of the Colorado Fuel & Iron Co., Denver. He will continue as assistant to the president, performing such duties in that capacity as may be assigned to him by the president.

—

Dr. Robert J. Anderson, consulting metallurgical engineer, 1658 Woodward Avenue, Lakewood, Ohio, has been appointed district manager in Cleveland and the Ohio district and surrounding territory for F. J. Ryan & Co., industrial heating engineer, Philadelphia. The company manufactures electric and fuel-fired furnaces, combustion and temperature control systems, oil and gas burners, core and mold ovens and other industrial heating equipment.

In 1912 suit was brought against the Aluminum Co. of America in which it was charged with violating the Sherman anti-trust law. Under a consent decree the Aluminum company was enjoined from attempting to enforce certain provisions in its contracts with the General Commercial Co. and the Norton Co. and the latter companies bound themselves not to enter into the production of aluminum. A statement issued Jan. 2 by the Department of Justice declares that so far as facts thus far disclosed are concerned there is no evidence that the company has violated the decree.

New Steel and Iron Capacity

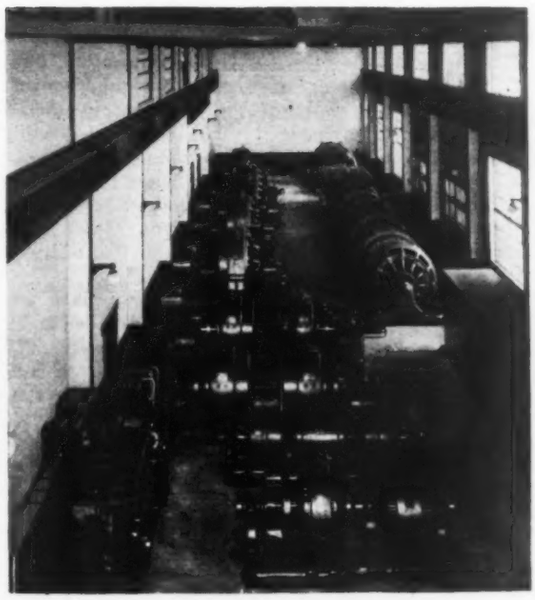
(*Continued from page 62*)

electrification of the company's rolling mills. The probable cost will be about $4,000,000.

Inland Steel Co.

The Inland Steel Co., Chicago, has under construction a fourth blast furnace which is to be known as No. 4. It is expected that this furnace, which will have a capacity of at least 600 tons per day, will be ready for blowing in early this year.

The company is also constructing 77 Koppers by-product coke ovens as well as an addition to the power station in its No. 2 plant. It also has under way the converting of its steam-driven units to electric power in its No. 1 plant, embracing a plate mill, a 24-in. structural mill, a continuous merchant mill and an 18-in. sheet mill.



Motor Room of 14-In. Continuous Mill at the Woodlawn Plant of the Jones & Laughlin Steel Corporation, Showing 13,500-Kw. General Electric Synchronous Motor Generators

Harrisburg Pipe & Bending Co.

The Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., replaced last year a few gas-fired heating furnaces with coal-fired furnaces, and installed a new 3000-lb. board drop hammer and a 100-ton trimming press in its drop forge department. During 1926 the company expects to install a 1200-ton hydraulic piercing press to be used in connection with the manufacture of drop forged, seamless steel couplings, bull plugs, pump liners, tool joint forgings, etc., and a new 8000-lb. steam drop hammer and a 250-ton trimming press. The press is now being installed and will be put in operation early this year and the hammer and trimming press will probably be installed by Feb. 1.

Trumbull Steel Co.

The Trumbull Steel Co., Warren, Ohio, in 1925 built a new 100-ton open-hearth furnace and now has eight furnaces of that capacity. The Trumbull company also provided mixer cars with a view to using only hot metal from the blast furnace of the Trumbull Cliffs Furnace Co. in its open-hearth furnaces. Heretofore the company has used partly hot metal and partly cold metal for these furnaces.

McKinney Steel Co.

The McKinney Steel Co., Cleveland, last year started the construction of its finishing mill department that will include a 10-in. and a 12-in. merchant bar mill and also an extension to its semi-finishing department, in which an 18-in. billet mill will be erected to supply billets for its new bar mills. The mills are being built by the Morgan Construction Co. The foundations are now being built and it is expected that the mills will be ready for operation late this year.

United Alloy Steel Corporation

The United Alloy Steel Corporation, Canton, Ohio, during 1925 erected and placed in operation one 4-hole soaking pit, for its 35-in. blooming mill, three waste heat boilers in the open-hearth department of its South plant, and an open annealing furnace built by the Surface Combustion Co.

Ford Motor Co.

The Ford Motor Co., Detroit, completed its 14-in. merchant bar mill in 1925, and placed it in operation in November. In addition, it has nearly completed its open-hearth plant, having four 100-ton tilting furnaces, four soaking pits, and a 42-in.-32-in. continuous blooming and billet mill. The open-hearth furnaces and blooming and billet mill will be ready for operation about April 1. The Ford company plans to make further extensions to its steel making capacity during the year.

Wisconsin Steel Co.

The Wisconsin Steel Co., Harvester Building, Chicago, installed last year a new blooming mill which was described in THE IRON AGE, Oct. 15, 1925. The company now has under construction a universal mill which will roll small sizes of structural steel, plates, large rounds and flats and sections which cannot be rolled on the present finishing mills.

Ludlum Steel Co.

The Ludlum Steel Co., Watervliet, N. Y., doubled its grinding capacity by the construction of an addition to its grinding department building which was to be ready for operation in December. A continuous furnace is being constructed in which the recuperative equipment is made from the company's own heat and scale-resisting material. The company is also rebuilding one of its ingot heating furnaces at its 18-in. mill, thereby enlarging the capacity and output. The installation of a large capacity crane way and other handling equipment has just been completed which will increase the company's facilities for outside storage of raw material for the melting furnaces. At its blacksmith shop there is now being installed a set of modern type, down-draft forges.

Colonial Steel Co.

The Colonial Steel Co., Pittsburgh, installed last year a 3-ton Heroult electric furnace. Preparations are under way for the installation of one 5-ton oil-fired, automatic-controlled bar annealing furnace, and it is planned to follow this up with the construction of three or more additional furnaces to replace present installations. The company also expects to erect a new building of steel about 70 ft. x 225 ft. to house its annealing department and to give additional warehouse room. During 1926 plans are maturing for the nearly complete reinstallation of an electric power system covering generators, motors and wiring.

Universal Steel Co.

The Universal Steel Co., Bridgeville, Pa., expects to complete during the present year the remodeling of two 6-ton Heroult electric furnaces and the addition of one 3-ton electric furnace. The company also expects to add one 30-in. x 78-in., 2-high, reversing roughing mill and a 32-in. x 44-in. sheet mill. The

billet shipping and grinding departments will also be augmented.

West Leechburg Steel Co.

The West Leechburg Steel Co., Pittsburgh, last year built an extension of structural steel, 60 ft. x 120 ft., to its present 16-in. hot strip mill building. There was also installed a 25-ton overhead crane. There has been added an 18 x 24-in. cold-rolled finishing mill to the cold-rolled department. Two continuous annealing furnaces have also been added.

Other Steel Works Additions

The Donner Steel Co., Buffalo, N. Y., installed a 125-ton Treadwell type mixer ladle in its blast furnace department and changed its blooming mill drive from steam engine to electric drive.

The Gulf States Steel Co., Birmingham, Ala., is installing a 12-9-in. electrically driven bar mill with an 18-in. roughing stand. This will probably be in operation by March 1.

The Bourne-Fuller Co., Cleveland, practically completed in 1925 the rebuilding of the bolt and nut works at its Upson steel plant. The new building is a four-story structure, 70 x 100 ft., with a four-story L, 37 x 75 ft., and will be used for its various cold-working departments. The hot forge department is located in a building that is practically new.

The Kokomo Steel & Wire Co., Kokomo, Ind., is electrifying its entire plant and has abandoned its old steam-driven, reversing engine which drove the blooming mill. In its wire mill the company is also doing away with all steam-driven units and supplanting them with motor drives.

Blast Furnace Work

New blast furnace construction, as well as some improvements and enlargements to old stacks, are as follows:

Midland Coke & Iron Corporation

The Midland Coke & Iron Corporation, St. Louis, completed in the early part of July, last year, the construction of a slag crushing and screening plant which has a capacity of 500 to 600 tons of slag per day, crushed and sized to meet ordinary requirements for railroad ballast road building and concrete aggregate. This plant has been in operation continuously.

During 1926 the company reports that it is now building a new blast furnace and power plant which it expects to have ready for operation by summer. The hearth of the blast furnace is 18 ft. 6 in. and the furnace is 92 ft. high. Its rated capacity is 600 to 700 tons of pig iron per day.

Three new 800-hp. boilers are being added to the present boiler plant and pressure burners are being installed on the new stoves and boiler equipment to increase the efficiency of the power plant.

The company is also installing an electric power plant of 10,000-kw. capacity, which will furnish its own requirements and permit the company to supply electric current to many of the industries in the east side district.

With these additions, the company reports that it will have a productive capacity of 1100 to 1200 tons of pig iron per day and that its two furnaces will consume about 75 to 80 per cent of the production of its own coke ovens.

Hamilton Furnace Co.

John A. Savage & Co., Duluth, Minn., report that the Hamilton Furnace Co., Hamilton, Ohio, has done considerable work on its second furnace, which was noted in THE IRON AGE, Jan. 1, 1925, as under construction during 1924. It was not completed in 1925. The company is also building 45 Koppers coke ovens but progress has been delayed, due to difficulties in obtaining a gas contract with the city of Hamilton. At the general election, Nov. 3, the voters passed an ordinance containing a contract with the company by a vote of 9048 to 3801. Certain legal difficulties are now being adjusted and the company hopes soon to rush construction. It is expected that six or seven months will be required to complete the coke ovens. The entire plant will then be put in operation. The rated capacity of the furnace is about 175,000 tons per year.

Central Furnace Co.

The Central Furnace Co., Massillon, Ohio, which is affiliated with the Central Steel Co., broke ground in February last for a 600-ton blast furnace, which is expected to be ready for operation about May 1. The original plans provided for a by-product coke plant. However, no further action has been taken on the erection of the coke ovens, but the company expects to build these later. A power house is being built, but this will not be on as large a scale as was originally intended. The company has contracted to secure power from a public service corporation, and is erecting a power plant of only sufficient capacity to take care of the waste gas from its furnace.

Other Blast Furnace Work

The Hudson Valley Coke & Iron Corporation, Troy, N. Y., is building a blast furnace of 500 tons capactiy which will take the place of the old Burden furnace. It is also building a battery of 55 coke ovens which will consume 1560 tons of coal per day and produce 900 to 1000 tons of coke. The new blast furnace will be ready for blowing in early this spring.

The Perry Iron Co., Erie, last year built a by-product coke oven plant consisting of 37 Willputte ovens, which were fired during the fall.

The Toledo Furnace Co., Toledo, Ohio, last year built a new power plant in which was installed a 10,000-kw. turbo-generator and a turbo-blower. The plant was erected to provide a power plant of sufficient capacity to utilize all of the gas from the company's two blast furnaces.

The Mystic Iron Works, Boston, expects to have its new 400 to 450-ton blast furnace in operation during the month of June.

The Pulaski Iron Co., Philadelphia, is installing copper cooling plates in the lining of its blast furnace with the object of lengthening the life of the furnace.

Rolling Mill Improvements and Additions

The Indiana Rolling Mill Co., Newcastle, Ind., last year built an extension to its mill building of 60 x 120 ft. and installed a 630-hp. Springfield water tube boiler and a yard crane runway 260 ft. long with a 76-ft. span. On this runway there is a crane having a 15-ton main hoist and a 3-ton auxiliary hoist equipped with a 1½-ton electric magnet. During 1926 the company expects to construct a 3-stand, electrically driven 28-in. finishing mill.

The Acme Steel Co., Chicago, has under construction for completion in 1926 a continuous mill for the rolling of hot strip which will have 20-in. roughing rolls and 16-in. finishing rolls, and which will produce strip up to 20 in. in width. The company will also install five additional annealing ovens in its cold-rolled strip mill.

The Reading Iron Co., Reading, Pa., this year plans to build a new gas producer house, an addition to its central power house and a new building for the chemical and physical laboratory, as well as an emergency hospital.

The Jessop Steel Co., Washington, Pa., erected last year a central shipping department and has almost completed five stands of a 10-in. bar mill which should be ready for operation about March 1.

The Central Tube Co., Pittsburgh, completed last year and put in operation a new butt weld mill and one new lap weld mill. The company now has four butt and one lap weld mills.

The Keystone Steel & Wire Co., Peoria, Ill., has built a new warehouse containing about 50,000 sq. ft. of floor space.

The Kilby Car & Foundry Co., Anniston, Ala., expects to put in operation, during the early months of

this year, a 10-in. mill for producing rail steel reinforcing bars.

The Norton Iron Works, Ashland, Ky., recently installed and put in operation 204 wire screening cloth looms and 720 fine wire blocks.

The Simonds Saw & Steel Co., Lockport, N. Y., installed last year an electric annealing furnace with a capacity of 24,000 lb. of bars or sheets.

The Union Drawn Steel Co., Beaver Falls, Pa., at its Massillon, Ohio, and Hartford, Conn., plants has under construction new rough stock warehouses.

The Sellers Mfg. Co., Chicago, added during 1925 some new waste heat boilers to its furnaces.

The Seneca Iron & Steel Co., Buffalo, last year put in operation six new hot mills for the manufacture of sheet steel.

New Foundry Work

Additions and improvements to steel, iron and other foundries last year or contemplated for this year are as follows:

American Steel Foundries

The American Steel Foundries, Chicago, with five foundries in different cities in the United States, carried out the following improvements:

At the Alliance, Ohio, Works a battery of mechanically operated gas producers and waste heat boilers in connection with the open-hearth furnace department was installed and completed.

At the Granite City, Ill., Works last year four sand slinger units were installed, each complete with sand mills and sand handling equipment, thus doing away entirely with jarring machines.

Otis Elevator Co.

The Otis Elevator Co., New York, at its Buffalo plant completed last year an addition to its steel foundry building of approximately 100 x 100 ft., thus making the building about 100 x 500 ft. and materially increasing molding floor space. During the present year a 3-ton Moore electric steel furnace will be installed. These additions to melting capacity will approximately double the output, one Moore furnace being already in operation.

Vulcan Mold & Iron Co.

The Vulcan Mold & Iron Co., Latrobe, Pa., last year leased a foundry which it has called plant No. 2. In this a ½-ton Moore electric furnace has been installed with which electric furnace gray iron castings are being made. There was added also a 5-ton crane, a motor generator set and various other necessary machinery. The company is also producing in this plant split ingot molds. The plant has a capacity of 250 tons per month. At the company's No. 1 plant the addition of an outside crane-way and other improvements last year has increased productive capacity about 35 per cent.

Other Foundry Improvements

The Maynard Electric Steel Casting Co., Milwaukee, increased the capacity of its foundry during the past year approximately 50 per cent. It installed a second 3-ton electric furnace, several cranes, molding machinery, drying and annealing ovens. Plans for the coming year include an additional building, 120 x 400 ft., involving a cost of approximately $75,000.

The Chicago Steel Foundry Co., Chicago, installed last year a new electric annealing oven and a new electric core oven, as well as a sand blast tumbling mill and several molding machines, including two large Hermann jolt roll overs for the manufacture of some special castings weighing less than 200 lb. each, such as axle housings and truck frames, which require large flasks for satisfactory production. An extension to the cleaning room has also been under way.

The Lebanon Steel Foundry, Lebanon, Pa., is building a new chemical and physical testing laboratory, approximately 30 x 60 ft., one story, which will be fully equipped for the chemical and physical testing of all the material used by the company. Facilities for testing sands will also be included.

The Massillon Steel Castings Co., Massillon, Ohio, started last year to make various changes and improvements in its buildings. The foundry is being rearranged, labor-saving devices installed and additional cranes erected. The changes are expected to result in an increase of capacity from 250,000 to 300,000 tons per month. This construction work is scheduled for completion this month.

The Commonwealth Steel Co., St. Louis, completed last year the addition of one 40-ton open-hearth furnace. It also increased the capacity of its finishing department and power plant last year and is erecting a new office building which is just nearing completion.

The Reading Steel Casting Co., Reading, Pa., is installing a 7-ton Edmoore basic electric steel furnace.

New Electric Melting Furnace Capacity

AGAIN in 1925 the situation regarding the securing of detailed information concerning the American electric steel industry was much the same as it was the year before—only generalities available.

Real progress has, however, been made in the year just closed. From the data available, the largest number of new furnaces were installed or contracted for last year of any year since the war. The expansion has been confined to two or three companies. The details for the United States, as reported by the selling companies, are as follows:

Type	No. Installed or Contracted For
Moore (or Pittsburgh)	26
Swindell	8
Heroult	3
Greene	2
Vom Baur	1
Edmoore	1
Gibney-McLain	1
Kay	1
Total	43

Companies to which these furnaces have been sold and the purpose for which they are to be used are not divulged in most cases.

Large Sales by One Company

The feature last year, as in 1924, was the large business done by the Pittsburgh Electric Furnace Corporation, Pittsburgh. It surpassed any record of previous years in selling 26 furnaces in the United States and one in Canada. The 1924 sales were 24. The company's record of sales since 1917 is as follows, for the United States and Canada:

In 1917, 3; in 1918, 5; in 1919, 7; in 1920, 11; in 1921, 14; in 1922, 17; in 1923, 21; in 1924, 24, and in 1925, 27.

The company reports that there were, on Jan. 1, 1926, 126 of its furnaces credited to American companies with 10 in foreign countries.

Two Heroult furnaces were sold by the American Bridge Co., New York, to the Ford Motor Co., Dearborn, Mich., last year. The third furnace is understood to be a ¼-ton unit for the National Tube Co.'s Ellwood City Works.

William Swindell & Brothers, Pittsburgh, state that 8 electric melting furnaces were disposed of last year as follows: Two of 9 ft. 6 in. diameter; four of 7 ft. 6 in. diameter; one 5-ft. and one 3-ft. diameter.

The Greene Electric Furnace Co., Seattle, Wash., distributed the 3 furnaces it sold in 1925 as follows:

General Foundry Co., Tacoma, Wash., ½-ton furnace; Atlas Foundry & Machine Co., Tacoma, Wash., 1-ton furnace; Wallace Foundry Co., Ltd., Vancouver, B. C., 5-ton furnace.

Albert E. Greene, president of the company, reports that the most important development recently has been the combined use of the same furnace for iron and steel. One company has been producing about 150 tons of cast iron and 75 to 100 tons of steel per month with one furnace. This record will be doubled by a new furnace

Gray Iron Castings Being Produced for the First Time at a Foundry Exhibition in an Electric Furnace (Moore). This attracted large crowds at the Syracuse convention in October, 1925

just ordered. This practice is true of other Greene furnaces.

The Vom Baur Engineering Co., Woolworth Building, New York, was organized last year and reports the sale of one 300-lb. Vom Baur furnace to the Central Cutlery Co., Elizabeth, N. J. It will make iron castings. This makes 5 Vom Baur furnaces in the United States, one in Mexico and 2 in Japan.

New Types

Three new types of electric melting furnaces appeared in 1925: Edmoore, Gibney-McLain and Kay.

The Edmoore furnace will soon be operating as a 7-ton unit at the Reading Steel Casting Co., Reading, Pa. While rated as a 7-ton furnace, the electrical equipment and other details are based on 15-ton capacity operation. It has been developed by Edward T. Moore, consulting engineer, Syracuse, N. Y. It is to be used for making steel castings and also ingots which will be cogged down, rolled and drawn into wire for suspension bridge cables.

The Gibney-McLain furnace has been operating since April 1, 1925, at the plant of the W. P. Taylor Co., Buffalo, N. Y. It is a 1½-ton furnace using Acheson graphite electrodes. Both steel, semi-steel and gray iron castings are being produced. It operated at first with an acid bottom but it has been changed to basic. The furnace is under the direct oversight of J. W. Gibney, manager of the company, and J. L. Gibney, electrometallurgist. Sales are being made through McLain's System, Inc., Milwaukee.

The Kay furnace was described in THE IRON AGE, Nov. 26, 1925, page 1453. It is in operation at the Kay-Brunner Steel Casting Co., Los Angeles, Cal. A special feature is that it is a tilting 2-spout furnace.

Constant changes are being made each year in the location of various furnaces because of sales from one steel company to another. In the last two or three years these have been numerous.

Summary

The record of expansion, as presented by the annual review issues of THE IRON AGE for the last few years, or since the industry started, has been in accordance with the following table:

Period	New Furnaces	Period	New Furnaces
July, 1913, to Jan. 1 1915	22	1920	33
1915	32	1921	32
1916	63	1922	18
1917	97	1923	33
1918	54	1924	40
1919	36	1925	43

Sales of furnaces last year to American users, therefore, were the largest since the war. The above data call for 503 furnaces on Jan. 1, 1926, in the United States. Many of those in existence prior to 1925 have, however, been scrapped or abandoned. Allowing liberally for these and for some sales not made public, a conservative estimate would place the American total at close to 475. The Heroult furnace leads with the largest total, about 180, with the Moore furnace second at 126.

Automobiles and Trucks Produced in 1925 Total 4,325,000

Automobile production in 1925 broke all records, the total for both passenger cars and trucks being 4,325,000, according to a statement issued by the National Automobile Chamber of Commerce. The previous high record was 4,086,997 in 1923. The 1924 output totaled 3,617,602.

Passenger automobiles manufactured in 1925 totaled 3,833,000, as compared with the previous high record of 3,694,237 in 1923 and 3,243,285 in 1924. Motor truck production made a big gain, probably due in part to the increasing use of motor buses for urban and suburban traffic, the total for 1925 reaching 492,000. In 1923 392,760 were produced and 374,317 in 1924.

Increasing tonnages of steel are used in the manufacture of automobiles due to the growing demand for closed steel bodies. The substitution of pressed metal for parts formerly made in the foundry also adds to the amount of steel consumed by the industry.

Taking an average of one ton of steel for passenger cars and trucks, the total of steel consumed by the automobile industry would be 4,325,000 net tons, which is not far from the figure reported by the steel companies as their estimate of the rolled steel shipped in 1925 to the automobile makers.

Smaller Production of Malleable Castings in November

WASHINGTON, Jan. 2.—Production of malleable castings in November totaled 61,845 tons, according to the Department of Commerce, whose estimate is based on reports from 142 plants, of which five were idle. Shipments in November amounted to 55,719 tons, and orders booked 55,627 tons. In connection with orders the report states that 10 plants were unable to furnish data on this item. The monthly capacity of the plants having been 110,793 tons, operations were at the rate of 55.8 per cent. The November figures showed declines in each item when compared with the October figures. Production in October was 68,234 tons. Except for October, however, November production was the highest since April, and percentage operated the highest since January, 1925.

The American Sheet & Tin Plate Co. has donated $5,000 to a fund for the construction of a new hospital at Connellsville, Pa., to be known as the Connellsville Community Hospital. The H. C. Frick Coke Co., another Steel Corporation subsidiary, has given $25,000. Those directing the campaign for the fund express gratification over these donations, since both companies maintain emergency hospital facilities.

Iron and Steel Prices for Sixteen Years

Monthly Averages Computed from the Weekly Market Quotations of THE IRON AGE in the Period of 1910 to 1925

IN this issue of THE IRON AGE are our two colored price charts, in which plotted lines indicate the course of prices for pig iron, billets, scrap and leading forms of finished iron and steel and non-ferrous metals in the 14 years ended with 1925. The diagrams are based on monthly averages of prices quoted week by week in our market reports from the leading selling centers. In the tables following are the monthly average prices of more than 80 products, including those on which the charts are based.

Bessemer Pig Iron at Pittsburgh, per Gross Ton (2240 lb.)

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$19.90	$15.90	$15.05	$18.15	$14.96	$14.59	$21.58	$35.95	$37.25	$33.60	$40.00	$33.96	$21.56	$29.27	$24.76	$24.64
February	19.34	15.90	14.90	18.15	15.09	14.55	21.51	35.95	37.25	33.60	42.90	31.46	21.46	29.83	25.26	24.51
March	18.60	15.90	15.09	18.15	15.09	14.55	21.75	37.70	37.25	32.54	43.40	28.16	21.46	32.02	25.14	24.06
April	18.27	15.90	15.15	17.90	14.90	14.55	21.95	42.20	36.15	29.35	43.60	26.96	22.59	32.77	24.56	22.89
May	17.52	15.90	15.13	17.70	14.90	14.59	21.95	45.15	36.15	29.35	44.03	26.16	26.36	31.87	23.89	21.76
June	16.60	15.90	15.15	17.14	14.90	14.70	21.95	54.70	36.38	29.35	44.80	24.71	26.96	30.27	22.89	20.76
July	16.40	15.90	15.20	16.70	14.90	14.95	21.95	57.45	36.60	29.35	47.15	22.84	26.77	28.46	21.96	20.76
August	16.09	15.90	15.46	16.52	14.90	15.95	21.95	54.75	36.60	29.35	49.11	21.96	29.96	28.26	21.76	20.76
September	15.90	15.90	16.15	16.65	14.90	16.85	22.26	48.03	36.60	29.35	50.46	21.96	35.27	28.26	21.76	21.06
October	15.90	15.44	17.80	16.60	14.84	16.95	24.08	37.25	36.60	29.35	49.16	21.96	35.17	26.96	21.76	21.39
November	15.82	15.00	18.02	16.02	14.59	17.51	30.15	37.25	36.60	31.26	41.10	21.96	33.52	25.26	22.13	22.64
December	15.90	15.03	18.15	15.77	14.70	19.65	35.68	37.25	36.60	36.65	36.96	21.96	29.90	24.64	23.66	22.76
Average	*17.19*	*15.71*	*15.94*	*17.12*	*14.89*	*15.78*	*23.90*	*43.64*	*36.67*	*31.09*	*44.39*	*25.34*	*27.58*	*28.68*	*23.29*	*22.53*

Basic Pig Iron, f.o.b. Mahoning or Shenango Valley Furnace, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$16.87	$13.25	$12.35	$16.41	$12.50	$12.50	$17.81	$30.00	$33.00	$30.00	$37.40	$30.00	$18.15	$25.80	$21.25	$22.00
February	16.31	13.65	12.25	16.30	13.19	12.50	17.69	30.00	33.00	30.00	42.25	27.50	17.75	26.25	22.00	22.00
March	16.00	13.75	12.81	16.11	13.00	12.50	18.20	32.25	33.00	28.94	41.50	24.20	17.94	30.13	21.94	21.30
April	15.94	13.75	13.00	15.87	13.00	12.50	18.13	38.75	32.00	25.75	42.40	22.88	20.00	31.05	21.55	20.13
May	15.19	13.32	13.00	15.15	13.00	12.50	18.00	41.60	32.00	25.75	43.25	22.00	24.60	29.00	20.50	18.81
June	14.70	13.05	13.12	14.50	13.00	12.59	18.00	48.75	32.00	25.75	44.00	20.75	25.00	27.38	19.63	18.05
July	14.50	13.12	13.40	14.37	13.00	12.74	18.00	52.50	32.00	25.75	45.85	19.38	24.25	25.10	19.00	18.00
August	14.12	13.00	13.94	14.06	13.00	14.06	18.00	51.20	32.00	25.75	48.10	18.20	26.60	24.75	19.00	18.00
September	13.70	12.80	14.37	14.00	13.00	14.75	18.31	42.75	32.00	25.75	48.50	19.13	32.63	24.88	19.00	18.30
October	13.15	12.52	15.98	13.90	12.81	15.00	19.88	33.00	33.00	25.75	43.75	19.19	30.90	23.50	19.00	18.63
November	13.25	12.42	16.37	13.09	12.48	15.75	25.10	33.00	33.00	28.31	36.50	19.00	27.75	20.88	19.13	19.88
December	13.40	12.25	16.50	12.71	12.50	17.50	30.00	33.00	33.00	34.25	33.00	18.63	24.81	21.00	20.90	20.00
Average	*14.76*	*13.07*	*13.92*	*14.71*	*12.87*	*13.74*	*19.76*	*38.90*	*32.50*	*27.65*	*42.21*	*21.74*	*24.20*	*25.81*	*20.24*	*19.59*

Southern No. 2 Foundry Pig Iron at Cincinnati, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.25	$14.25	$13.25	$16.95	$13.88	$12.40	$17.90	$26.10	$35.90	$34.60	$41.80	$36.75	$20.70	$27.45	$25.55	$24.05
February	17.06	14.25	13.31	16.69	13.81	12.40	17.90	27.53	35.90	34.60	43.60	32.63	20.00	28.68	26.55	24.05
March	16.30	14.25	13.50	16.31	14.00	12.27	17.90	31.90	35.90	33.54	43.60	29.80	19.50	30.80	26.55	24.05
April	15.37	14.25	13.75	15.65	13.75	12.34	17.90	37.40	35.90	30.65	44.00	28.00	20.38	31.05	26.35	24.05
May	15.00	13.95	14.15	14.94	13.75	12.40	17.90	41.90	35.90	29.85	45.60	26.70	22.10	30.75	25.55	24.05
June	14.85	13.44	14.25	14.06	13.63	12.50	17.34	45.15	36.08	28.39	45.60	26.38	23.00	29.30	24.05	23.25
July	14.75	13.25	14.70	13.75	13.30	12.71	16.90	49.90	36.60	28.35	45.60	24.75	22.30	28.85	22.05	22.18
August	14.31	13.45	15.06	14.06	13.25	13.71	16.70	49.90	36.60	30.40	45.78	23.50	24.35	27.68	21.55	22.55
September	14.25	13.31	15.87	14.25	13.25	14.15	17.28	49.90	36.60	31.25	46.50	23.50	29.55	26.55	21.55	22.85
October	14.25	13.25	16.80	14.35	12.90	14.78	18.03	49.38	37.60	31.60	46.50	23.50	30.85	24.68	21.55	23.43
November	14.25	13.20	17.25	13.87	12.90	16.15	22.40	35.90	37.60	34.35	42.50	22.90	27.55	23.65	21.80	24.87
December	14.25	13.19	17.25	13.95	12.50	17.10	25.90	35.90	37.60	38.60	42.50	21.75	26.93	25.05	23.85	25.49
Average	*15.16*	*13.67*	*14.93*	*14.90*	*13.41*	*13.58*	*18.67*	*40.07*	*36.52*	*32.16*	*44.47*	*26.68*	*23.93*	*27.87*	*23.91*	*23.74*

Local No. 2 Foundry Pig Iron at Chicago (at Furnace), per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$19.00	$15.50	$14.00	$17.90	$13.75	$13.00	$18.50	$30.00	$33.00	$31.00	$40.00	$31.50	$18.90	$28.90	$23.70	$24.00
February	19.00	15.50	14.00	17.31	14.00	13.00	18.50	32.00	33.00	31.00	42.25	29.00	19.00	29.75	24.50	24.00
March	18.30	15.50	14.00	17.25	14.25	12.95	18.70	36.00	33.00	29.94	43.00	25.60	20.00	31.25	24.38	23.80
April	17.50	15.00	14.00	17.00	14.25	13.00	19.00	39.25	33.00	26.75	43.00	24.00	20.50	32.00	24.10	22.50
May	17.06	15.00	14.50	16.00	14.06	13.00	19.00	43.80	33.00	26.75	43.00	22.80	22.60	32.00	22.75	21.13
June	16.75	15.00	14.50	15.62	13.69	13.00	19.00	51.00	33.00	26.75	43.40	20.75	23.25	31.25	21.25	20.30
July	16.56	14.87	14.70	14.70	13.75	13.00	19.00	55.00	33.00	26.75	45.25	19.00	24.25	27.90	19.60	20.50
August	16.50	14.50	15.37	15.00	13.69	13.44	18.40	55.00	33.00	26.75	46.00	19.55	28.60	27.00	20.38	20.50
September	16.40	14.50	16.00	15.00	13.25	13.90	18.13	54.67	33.00	26.75	46.00	21.75	32.00	26.75	20.50	21.00
October	16.00	14.46	17.00	15.00	12.94	14.63	19.63	33.00	34.00	27.75	44.50	21.00	31.40	25.00	20.50	21.63
November	16.00	14.09	17.75	14.87	12.56	17.13	25.80	33.00	34.00	31.00	39.40	20.60	29.75	23.13	21.00	22.75
December	16.00	14.00	18.00	14.30	13.00	18.10	29.50	33.00	34.00	38.75	34.50	19.63	28.00	23.00	22.50	23.00
Average	*17.09*	*14.83*	*15.32*	*15.83*	*13.60*	*14.01*	*20.26*	*44.31*	*33.25*	*29.16*	*42.53*	*22.93*	*24.85*	*28.16*	*22.10*	*22.09*

Standard Brands Eastern Pennsylvania No. 2X Foundry Pig Iron at Philadelphia, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$19.00	$15.50	$14.85	$18.25	$14.65	$14.25	$19.94	$30.10	$34.25	$36.15	$44.10	$33.34	$21.34	$29.76	$24.11	$25.01
February	18.69	15.50	14.85	18.25	14.94	14.25	20.00	31.88	34.25	36.15	45.10	31.09	21.09	30.01	24.04	25.01
March	18.00	15.50	14.92	17.77	15.00	14.25	20.05	37.31	34.25	34.39	45.53	27.59	21.26	32.30	24.16	24.21
April	17.75	15.50	15.00	17.40	15.00	14.25	20.50	41.38	34.25	31.90	46.85	26.26	23.62	32.95	23.06	22.82
May	17.00	15.50	15.18	16.75	14.81	14.25	20.50	43.60	34.25	30.70	47.10	25.71	26.09	32.76	22.67	21.51
June	16.55	15.25	15.31	16.19	14.75	14.25	19.94	48.19	34.29	29.50	47.15	25.50	27.06	30.76	21.85	21.26
July	16.25	15.00	15.70	15.60	14.75	14.31	19.75	53.13	34.40	29.08	48.15	23.55	27.92	27.68	21.26	21.26
August	16.00	15.00	15.87	15.60	14.75	14.94	19.55	53.00	34.40	29.60	51.96	20.64	32.26	25.89	21.51	21.57
September	16.00	15.00	16.59	15.83	14.75	16.00	19.50	51.67	34.40	30.70	53.51	21.22	34.83	26.26	21.76	21.96
October	15.81	15.00	17.60	15.95	14.63	16.25	20.31	34.25	38.85	32.10	52.53	22.23	32.54	24.04	21.76	22.64
November	15.68	14.95	18.25	15.56	14.50	17.12	24.90	34.25	39.15	35.35	44.99	22.74	30.39	23.01	22.64	23.64
December	15.50	14.85	18.25	15.20	14.25	19.05	29.25	34.25	39.15	40.10	35.54	21.82	28.86	24.26	24.56	24.26
Average	*16.85*	*15.21*	*16.03*	*16.53*	*14.73*	*15.26*	*21.18*	*41.08*	*35.49*	*32.98*	*46.88*	*25.14*	*27.27*	*28.31*	*22.78*	*22.93*

Mahoning and Shenango Valley No. 2 Foundry Iron, at Furnace, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.00	$13.75	$13.00	$17.50	$12.85	$13.00	$18.50	$31.00	$33.00	$31.00	$39.40	$31.88	$19.30	$27.00	$22.50	$22.38
February	16.69	13.75	13.00	17.00	13.19	13.00	18.31	32.00	33.00	31.00	41.50	28.00	18.88	27.50	23.00	22.00
March	16.10	13.75	13.12	16.69	13.25	13.00	18.50	34.75	33.00	29.94	41.25	25.90	19.00	30.50	23.00	21.10
April	15.62	13.75	13.25	15.55	13.25	12.75	18.50	39.75	33.00	26.75	42.80	24.75	20.75	31.00	21.80	20.13
May	15.31	13.75	13.25	14.62	13.00	12.94	16.20	42.40	33.00	26.75	44.25	23.50	23.80	30.20	20.75	19.13
June	14.75	13.56	13.25	14.06	13.00	12.69	18.13	50.25	33.00	26.75	45.00	22.10	24.00	27.63	19.63	18.30
July	14.31	13.50	13.37	13.87	13.00	12.70	18.25	54.50	33.00	26.75	45.00	20.13	24.25	25.50	19.00	18.50
August	14.15	13.50	13.69	14.00	13.00	13.62	18.25	53.20	33.00	26.75	47.00	19.63	32.60	24.88	19.13	18.50
September	13.75	13.44	14.44	14.00	13.00	14.70	18.39	47.00	33.00	26.75	49.40	21.00	34.88	24.75	19.80	18.80
October	13.94	13.37	16.10	13.84	12.90	14.87	20.00	33.00	34.00	26.75	46.50	21.00	31.80	23.60	19.50	19.13
November	13.90	13.20	16.94	13.50	12.75	15.50	25.00	33.00	34.00	31.50	40.25	20.75	27.88	21.88	19.50	20.39
December	13.75	13.00	17.25	13.50	12.75	18.30	30.75	33.00	34.00	36.75	36.20	20.00	25.63	22.00	21.20	20.50
Average	*14.94*	*13.53*	*14.22*	*14.84*	*13.00*	*13.92*	*20.07*	*40.32*	*33.25*	*28.95*	*43.21*	*23.22*	*25.23*	*26.37*	*20.73*	*19.90*

Gray Forge Pig Iron, Philadelphia and Vicinity, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.25	$14.25	$14.25	$17.65	$14.00	$13.50	$18.44	$28.38	$32.00	$33.90	$40.23	$32.78	$20.60	$27.85	$22.81	$24.00
February	17.50	14.25	14.25	17.31	14.00	13.44	19.00	29.75	32.00	33.90	40.50	30.90	20.50	28.37	22.50	23.63
March	16.90	14.60	14.25	16.87	14.00	13.25	19.00	31.94	32.00	32.84	43.00	26.86	20.50	29.62	22.12	23.40
April	16.62	14.75	14.37	16.56	14.00	13.25	19.13	38.50	32.00	29.65	43.00	25.26	21.25	30.37	22.00	22.63
May	16.00	14.70	14.50	15.81	13.81	13.25	19.50	40.40	32.00	29.21	43.00	25.26	23.80	29.50	22.00	21.50
June	15.65	14.50	14.62	15.37	13.75	13.25	19.25	44.31	32.00	26.25	43.00	24.69	24.25	28.00	22.00	21.50
July	15.37	14.50	14.87	14.95	13.75	13.25	18.50	50.05	32.00	25.92	43.00	22.50	25.50	26.90	21.20	21.50
August	15.00	14.30	15.37	14.62	13.75	14.50	18.50	49.56	32.00	26.60	45.46	21.20	29.00	25.50	21.00	21.00
September	14.75	14.45	15.87	14.56	13.75	15.13	18.50	44.25	32.00	27.00	47.10	20.00	31.00	25.50	21.00	21.00
October	14.50	14.25	16.87	15.00	13.62	15.25	19.35	32.20	36.60	28.69	47.10	20.50	31.00	24.20	21.00	21.25
November	14.37	14.25	17.62	14.75	13.50	16.05	23.75	32.00	36.60	32.40	44.64	22.50	29.14	23.00	21.37	22.00
December	14.25	14.25	17.75	14.58	13.50	17.63	27.69	32.00	36.90	36.10	38.74	21.69	28.14	23.00	23.10	23.00
Average	*15.67*	*14.42*	*15.38*	*15.67*	*13.79*	*14.31*	*20.05*	*37.78*	*33.18*	*30.21*	*43.23*	*24.51*	*25.39*	*26.82*	*21.84*	*22.20*

Malleable Pig Iron at Chicago, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$19.00	$15.50	$14.35	$17.90	$13.88	$13.00	$19.00	$30.94	$33.50	$31.50	$40.50	$32.00	$18.90	$28.90	$23.88	$24.00
February	19.00	15.50	14.14	17.31	13.94	13.00	19.00	31.75	33.50	31.50	42.75	29.38	19.13	29.75	24.50	24.00
March	18.40	15.50	14.00	17.25	14.25	13.00	19.40	35.40	33.50	30.44	43.50	25.80	20.00	31.25	24.38	24.00
April	17.50	15.25	14.00	17.05	14.25	13.00	19.50	39.00	33.50	27.25	43.50	24.00	20.50	32.00	24.10	22.63
May	17.06	15.00	14.40	16.00	14.06	13.00	19.50	42.60	33.50	27.25	43.50	23.00	22.60	32.00	22.75	21.25
June	16.75	15.00	14.50	15.62	13.88	13.00	19.50	50.25	33.50	27.25	43.50	21.50	23.25	31.25	21.25	20.60
July	16.56	15.00	14.50	14.65	14.00	13.00	19.50	55.00	33.50	27.25	45.25	19.00	24.25	27.90	19.60	20.50
August	16.50	14.80	15.10	15.00	14.00	13.44	19.00	55.00	33.50	27.25	46.50	19.60	28.60	27.00	20.38	20.50
September	16.40	14.50	16.25	15.00	13.25	14.30	19.00	54.75	33.50	27.25	46.50	21.75	32.00	26.75	20.50	21.00
October	16.06	14.50	17.10	15.20	13.00	15.25	19.88	33.50	34.50	28.25	45.75	21.00	31.40	25.00	20.50	21.63
November	16.00	14.35	17.87	14.87	12.88	17.13	25.80	33.50	34.50	31.50	39.90	20.60	29.75	23.13	20.88	22.75
December	16.00	14.35	18.00	14.63	12.90	18.20	29.50	33.50	34.50	39.50	35.00	19.63	28.00	23.00	22.62	23.00
Average	*17.10*	*14.94*	*15.35*	*15.87*	*13.69*	*14.11*	*20.72*	*41.35*	*33.75*	*29.68*	*43.01*	*23.11*	*24.87*	*28.16*	*22.11*	*22.15*

Lake Superior Charcoal Pig Iron at Chicago, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$19.50	$17.87	$16.00	$18.15	$15.25	$15.75	$19.50	$31.75	$37.50	$38.85	$48.75	$42.50	$31.10	$33.15	$29.15	$29.04
February	19.50	17.50	15.95	18.00	15.25	15.75	19.75	33.75	37.50	38.85	58.38	39.50	29.38	33.90	29.15	29.04
March	19.30	17.50	15.75	18.00	15.25	15.75	19.75	36.75	37.50	38.85	58.20	38.50	26.00	35.40	29.15	29.04
April	19.00	17.50	15.75	18.00	15.45	15.75	19.75	40.25	37.50	31.75	57.25	38.50	26.50	36.53	29.15	29.04
May	18.62	17.25	15.75	18.00	15.75	15.75	19.75	48.15	37.50	31.75	57.50	37.50	28.40	36.65	29.15	29.04
June	18.50	16.80	16.75	16.81	15.75	15.75	19.75	52.88	37.62	31.75	57.50	37.50	29.75	36.65	29.12	29.04
July	18.50	16.50	16.25	15.65	15.75	15.75	19.75	57.75	38.00	31.75	57.50	36.37	31.65	34.81	29.04	29.04
August	18.50	16.50	16.25	14.69	15.75	16.00	19.75	58.00	38.00	32.25	57.70	33.60	34.05	32.04	29.04	29.04
September	18.40	16.50	17.12	15.25	15.75	15.85	19.75	58.00	38.00	32.75	58.50	33.00	36.15	32.04	29.04	29.04
October	18.12	16.50	18.65	15.25	15.75	15.75	20.25	37.50	38.00	33.44	58.50	31.50	36.15	29.86	29.04	29.04
November	18.00	16.50	18.65	15.25	15.75	17.00	26.46	37.50	38.70	38.50	55.75	31.50	36.15	28.40	29.04	29.04
December	18.00	16.37	18.75	15.25	15.75	18.65	31.75	37.50	38.70	43.00	49.13	31.50	34.65	29.15	29.04	29.04
Average	*18.66*	*16.94*	*16.80*	*16.53*	*15.60*	*16.13*	*21.33*	*44.15*	*37.88*	*35.29*	*56.22*	*35.96*	*31.66*	*33.22*	*29.09*	*29.04*

No. 2 Foundry Pig Iron at Buffalo, (at Furnace) per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$16.94	$14.00	$13.50	$17.43	$12.85	$12.89	$18.75	$34.94	$33.00	$31.00	$40.90	$32.38	$19.44	$26.94	$22.25	$23.00
February	17.00	13.69	13.50	17.06	12.94	13.00	18.53	35.25	33.00	31.00	42.00	30.50	18.87	27.56	22.25	22.75
March	16.95	14.06	13.63	16.70	13.22	12.41	18.72	38.45	33.00	29.94	44.75	29.00	18.30	29.05	21.81	22.12
April	16.31	13.75	13.56	16.22	13.50	12.80	18.88	42.62	33.00	26.75	45.00	26.15	20.81	29.56	21.37	20.65
May	16.00	13.69	13.50	15.18	13.41	12.88	18.78	44.95	33.00	26.75	45.00	25.62	22.62	29.40	20.25	19.00
June	15.25	13.39	13.88	14.32	13.13	12.87	18.65	48.31	33.00	26.75	44.75	23.42	23.05	29.06	19.37	19.00
July	14.69	13.25	14.03	13.83	13.05	12.70	18.70	52.25	33.00	26.63	45.00	20.87	24.50	26.00	19.00	18.85
August	14.25	13.50	14.50	13.98	13.25	13.85	18.63	53.00	33.00	27.77	47.75	19.50	30.70	24.95	19.19	18.72
September	14.25	13.69	15.50	14.09	13.22	14.90	19.00	53.00	33.00	28.25	50.10	20.00	33.94	24.87	19.37	18.75
October	14.19	13.10	16.62	14.00	12.72	15.63	20.37	33.00	34.00	28.70	47.44	20.37	31.12	23.06	19.05	19.40
November	14.30	13.06	17.25	13.69	12.44	16.28	27.25	33.00	34.00	34.30	42.56	19.12	27.80	20.87	20.50	21.19
December	14.50	13.25	17.56	12.87	12.95	18.13	32.75	33.00	34.00	38.25	36.60	19.30	25.50	21.56	22.62	21.50
Average	*15.39*	*13.54*	*14.75*	*14.95*	*13.06*	*14.03*	*20.75*	*41.81*	*33.25*	*29.67*	*44.32*	*23.85*	*24.72*	*26.07*	*20.59*	*20.41*

No. 2 Foundry Pig Iron at Cleveland, (Delivered Consumer) per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.83	$14.25	$13.25	$17.87	$13.50	$13.44	$19.30	$31.10	$33.30	$31.40	$40.00	$33.40	$20.06	$27.87	$23.70	$23.87
February	17.48	14.13	13.25	17.53	13.82	13.50	19.23	32.93	33.30	31.40	41.90	30.22	20.06	29.00	24.50	23.99
March	16.82	14.13	13.25	17.16	14.25	13.47	19.05	37.06	33.30	30.58	43.15	27.80	21.55	32.15	24.50	23.47
April	16.34	14.25	13.25	16.39	14.25	13.38	19.36	40.27	33.30	27.15	43.40	26.62	20.81	32.52	24.25	22.82
May	16.18	14.25	13.30	15.62	14.38	13.38	19.45	42.90	33.30	27.15	44.53	25.50	23.75	32.21	23.25	20.87
June	15.46	14.25	13.56	14.96	14.25	13.28	19.07	50.63	33.32	27.15	44.90	24.00	24.06	30.46	21.50	20.12
July	15.14	13.94	13.81	14.69	13.75	13.20	18.79	55.80	33.40	27.15	45.20	21.31	24.75	27.44	20.25	20.00
August	14.55	13.75	14.19	14.68	13.75	14.32	18.76	55.17	33.40	27.40	48.06	20.50	31.31	26.40	20.56	20.00
September	14.50	13.75	15.45	14.75	13.75	15.27	18.92	53.15	33.40	27.65	49.86	20.75	35.94	25.87	20.81	20.00
October	14.31	13.70	16.85	14.83	13.73	15.43	20.12	33.30	34.40	28.15	47.88	20.75	34.09	25.25	21.00	20.55
November	14.15	13.25	17.59	14.40	13.51	16.61	26.20	33.30	34.40	31.90	43.46	20.56	30.47	23.35	21.31	22.32
December	14.25	13.25	17.87	13.78	13.27	18.18	31.13	33.30	34.40	36.90	36.32	19.95	27.25	23.06	22.39	22.26
Average	*15.58*	*13.91*	*14.64*	*15.56*	*13.85*	*14.46*	*20.78*	*41.58*	*33.60*	*29.67*	*44.06*	*24.28*	*26.18*	*27.97*	*22.34*	*21.69*

Southern No. 2 Foundry Pig Iron at Birmingham, Dollars per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$14.13	$11.00	$10.00	$13.56	$10.63	$9.50	$15.00	$23.20	$33.00	$31.00	$38.75	$32.25	$16.20	$23.25	$21.50	$20.00
February	14.00	11.00	10.06	13.38	10.56	9.50	15.00	24.63	33.00	31.00	40.00	28.13	15.00	24.38	22.50	20.00
March	13.42	11.00	10.25	13.06	10.70	9.35	15.00	29.00	33.00	29.44	40.00	25.30	15.00	26.40	22.50	20.00
April	12.75	11.00	10.55	12.40	10.50	9.44	15.00	34.50	33.00	26.75	40.50	23.50	15.88	27.00	22.30	20.00
May	12.00	10.70	10.94	11.69	10.50	9.44	15.00	39.00	33.00	26.75	42.00	22.20	17.60	26.85	21.50	20.00
June	12.00	10.19	11.00	10.81	10.35	9.65	14.50	42.25	33.00	25.25	42.00	21.88	18.38	25.75	20.00	19.60
July	12.00	10.00	11.45	10.50	10.00	9.75	14.00	47.00	33.00	25.15	42.00	20.25	18.25	25.00	18.00	18.00
August	11.50	10.20	11.81	10.81	10.00	10.75	13.80	47.00	33.00	27.38	42.00	19.00	20.10	23.70	17.50	18.00
September	11.50	10.06	12.75	11.00	10.00	11.50	14.38	47.00	33.00	27.95	42.00	19.00	26.00	22.75	17.50	18.50
October	11.50	10.00	13.50	11.25	10.00	12.13	15.50	33.00	34.00	28.00	42.00	19.00	26.80	20.63	17.50	19.38
November	11.00	9.94	14.00	10.63	10.00	13.40	20.13	33.00	34.00	30.75	38.00	18.40	23.50	19.60	17.75	21.00
December	11.00	9.94	14.00	10.70	9.60	14.38	23.00	33.00	33.40	35.20	38.00	17.33	22.88	21.00	19.80	22.00
Average	*12.23*	*10.42*	*11.69*	*11.65*	*10.24*	*10.73*	*15.86*	*36.05*	*33.20*	*28.72*	*40.60*	*22.19*	*19.63*	*23.86*	*19.86*	*19.71*

Bessemer Pig Iron, per Gross Ton, at Valley Furnace

	1920	1921	1922	1923	1924	1925
January	$38.60	$32.00	$19.60	$27.50	$23.00	$22.88
February	41.50	29.00	19.50	28.06	23.50	22.75
March	42.00	26.20	19.50	30.25	23.38	22.30
April	42.20	25.00	20.63	31.00	22.80	21.13
May	42.63	24.20	24.40	30.10	22.13	20.00
June	43.00	22.75	25.00	28.50	21.13	19.00
July	45.60	20.88	25.00	26.70	20.20	19.00
August	47.39	20.00	28.20	26.50	20.00	19.00
September	48.50	20.00	33.50	26.50	20.00	19.30
October	47.25	20.00	33.40	25.20	20.00	19.63
November	40.25	20.00	31.75	23.25	20.38	20.88
December	35.00	20.00	28.13	22.88	21.90	21.00
Average	*42.82*	*23.34*	*25.63*	*27.20*	*21.53*	*20.57*

Basic Pig Iron, per Gross Ton, Delivered Eastern Pennyslvania

	1920	1921	1922	1923	1924	1925
January	$39.19	$33.51	$20.18	$27.80	$23.00	$24.25
February	41.90	30.65	19.84	28.19	22.69	23.88
March	44.24	26.15	22.61	29.56	21.81	23.55
April	44.80	25.00	21.00	30.81	21.50	22.31
May	44.80	25.00	24.00	30.60	21.00	21.13
June	44.66	24.63	25.00	28.14	21.00	21.50
July	43.70	22.38	25.75	26.60	20.20	21.50
August	47.21	19.70	27.23	25.00	20.00	20.50
September	51.26	19.19	30.83	25.00	20.00	20.70
October	49.60	20.50	29.30	24.20	20.00	21.25
November	41.94	20.70	27.83	22.88	21.13	22.39
December	44.15	20.63	27.31	23.13	23.41	23.00
Average	*44.79*	*24.00*	*25.08*	*26.83*	*21.31*	*22.16*

Malleable Pig Iron, per Gross Ton, f.o.b. Valley Furnace

	1920	1921	1922	1923	1924	1925
January	$39.25	$32.00	$19.50	$27.00	$22.39	$22.39
February	42.75	28.75	19.00	27.63	23.00	22.00
March	42.40	25.80	19.00	30.50	22.50	21.50
April	43.25	25.00	19.50	31.00	22.10	20.63
May	43.88	24.10	24.20	30.20	21.00	19.25
June	44.20	22.75	24.50	28.13	19.88	18.50
July	45.00	20.88	25.13	25.40	19.00	18.50
August	48.40	20.00	29.50	24.50	19.13	18.50
September	50.00	20.13	33.50	24.50	19.80	18.80
October	49.00	20.50	32.70	23.30	19.50	19.13
November	39.30	20.20	29.00	20.88	19.75	20.38
December	35.00	20.00	26.25	20.00	21.20	20.50
Average	*43.53*	*23.34*	*25.15*	*26.09*	*20.77*	*20.01*

Virginia No. 2X Foundry Pig Iron, Delivered Eastern Pennsylvania (Per Gross Ton)

	1920	1921	1922	1923	1924	1925
January	$45.35	$40.49	$27.84	$32.97	$30.17	$29.67
February	47.35	37.24	27.61	33.17	30.52	29.67
March	47.55	34.59	27.24	33.79	30.67	29.67
April	48.85	32.99	27.74	34.67	30.67	29.67
May	49.85	32.99	28.24	35.07	30.67	29.17
June	50.15	32.99	28.24	33.17	30.67	29.17
July	50.10	31.86	30.17	32.27	29.87	29.17
August	54.90	29.94	30.17	31.42	28.67	29.17
September	55.48	28.49	36.17	30.92	28.67	28.77
October	54.74	28.24	38.17	30.17	28.67	28.17
November	50.59	28.24	37.17	30.17	28.67	28.17
December	43.50	28.24	33.92	30.17	29.27	28.17
Average	*49.87*	*32.19*	*31.06*	*32.33*	*29.77*	*29.05*

Gray Forge Pig Iron, per Gross Ton, f.o.b. Valley Furnace

	1920	1921	1922	1923	1924	1925
January	$37.60	$30.88	$19.00	$26.50	$22.00	$21.88
February	40.75	27.00	18.81	27.00	22.00	21.50
March	41.00	24.70	18.75	30.00	22.00	20.60
April	41.00	23.75	20.44	30.50	21.40	19.63
May	41.75	22.40	23.30	29.70	20.25	18.63
June	42.25	20.88	23.50	26.63	19.13	17.80
July	43.00	19.13	23.75	25.00	18.50	18.00
August	44.50	18.90	29.45	24.00	18.63	18.00
September	49.00	20.00	34.13	24.00	19.30	18.30
October	45.50	20.00	31.10	23.30	19.00	18.63
November	39.25	19.70	27.63	21.39	19.00	19.88
December	35.20	19.25	25.25	21.50	20.70	20.00
Average	*41.73*	*22.21*	*24.59*	*25.79*	*20.16*	*19.39*

Standard Low-Phosphorus Pig Iron at Furnace in Eastern Pennsylvania (Per Gross Ton)

	1920	1921	1922	1923	1924	1925
January	$48.25	$42.63	$30.00	$35.00	$27.10	$25.50
February	49.50	41.50	30.00	35.00	27.00	25.50
March	50.00	41.50	30.00	35.00	27.00	25.10
April	50.00	38.75	30.00	35.00	25.80	24.75
May	51.00	38.00	30.00	33.20	24.75	24.00
June	52.40	38.00	30.00	30.50	24.75	23.00
July	54.00	38.00	30.00	29.00	24.00	22.00
August	57.00	36.80	33.00	29.00	24.00	22.00
September	60.00	36.50	38.00	28.50	24.00	22.00
October	60.00	36.50	38.00	28.00	23.75	22.00
November	60.00	36.50	38.00	27.88	23.88	24.00
December	48.00	34.87	35.00	27.50	25.30	24.00
Average	*53.35*	*38.25*	*32.67*	*31.13*	*25.11*	*23.65*

THE IRON AGE Composite Iron and Steel Prices

Composite Pig Iron Price

Average of THE IRON AGE quotations on foundry and basic pig irons; basic iron at Valley furnace; foundry iron an average of Chicago, Birmingham and Philadelphia. Quoted in dollars per gross ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.12	$13.63	$12.65	$16.49	$12.76	$12.38	$17.81	$28.88	$33.21	$31.36	$39.08	$31.18	$18.48	$26.78	$22.15	$22.44
February	16.77	13.83	12.61	16.31	13.18	12.38	17.76	29.75	33.21	31.36	42.35	28.45	18.14	27.20	22.84	22.50
March	16.29	13.88	12.93	16.07	13.16	12.34	18.06	32.18	33.21	30.10	42.17	25.18	18.35	30.11	22.81	21.99
April	15.97	13.79	13.09	15.74	13.13	12.37	18.15	38.56	32.71	27.11	42.93	23.73	20.00	30.83	22.31	20.95
May	15.27	13.53	13.27	14.98	13.06	12.37	18.08	41.87	32.71	26.91	43.64	22.78	23.35	29.74	21.40	19.85
June	14.90	13.27	13.36	14.35	12.97	12.45	17.91	47.95	32.71	26.46	44.09	21.73	23.95	28.23	20.27	19.22
July	14.72	13.21	13.68	13.99	12.92	12.55	17.79	52.11	32.73	26.37	45.44	20.22	23.86	25.96	19.31	18.96
August	14.39	13.12	14.15	13.93	12.91	13.55	17.63	51.43	32.73	26.83	47.38	18.97	26.69	25.19	19.40	19.01
September	14.17	12.99	14.74	13.97	12.83	14.28	17.82	46.93	32.73	27.11	47.83	19.89	31.78	25.02	19.46	19.39
October	13.79	12.84	16.01	13.93	12.67	14.67	19.18	33.21	34.31	27.52	45.05	19.97	30.57	23.30	19.46	19.92
November	13.74	12.71	16.52	13.39	12.42	15.82	24.36	33.21	34.36	30.34	38.65	19.79	27.82	21.40	19.79	21.16
December	13.78	12.59	16.63	13.06	12.39	17.34	28.63	33.21	34.26	36.13	34.51	19.11	25.70	21.88	21.60	21.54
Average	*15.08*	*13.28*	*14.14*	*14.68*	*12.87*	*13.54*	*19.43*	*36.11*	*33.24*	*28.97*	*42.76*	*22.58*	*24.06*	*26.30*	*20.90*	*20.58*

Composite Price of Finished Steel

Average of THE IRON AGE quotations on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. Quoted in cents per pound

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	1.741	1.615	1.424	1.771	1.451	1.383	2.06	3.384	3.549	3.371	3.158	3.057	2.059	2.469	2.783	2.560
February	1.736	1.62	1.40	1.766	1.477	1.395	2.203	3.501	3.549	3.371	3.486	2.918	2.007	2.605	2.782	2.546
March	1.727	1.623	1.394	1.786	1.473	1.413	2.447	3.739	3.549	3.282	3.743	2.764	2.014	2.721	2.746	2.537
April	1.727	1.627	1.433	1.79	1.446	1.437	2.611	4.110	3.549	3.031	3.842	2.737	2.075	2.814	2.692	2.503
May	1.72	1.62	1.456	1.727	1.424	1.433	2.75	4.562	3.549	3.021	3.804	2.764	2.113	2.793	2.639	2.460
June	1.707	1.556	1.47	1.687	1.399	1.444	2.689	5.004	3.549	3.021	3.756	2.643	2.148	2.789	2.610	2.440
July	1.657	1.546	1.504	1.667	1.40	1.471	2.64	5.334	3.549	3.021	3.885	2.455	2.169	2.783	2.563	2.435
August	1.636	1.539	1.553	1.624	1.446	1.511	2.682	5.249	3.549	3.021	3.967	2.341	2.292	2.775	2.515	2.413
September	1.627	1.513	1.61	1.591	1.47	1.559	2.765	5.049	3.549	3.004	3.956	2.248	2.419	2.775	2.487	2.397
October	1.613	1.441	1.659	1.559	1.446	1.634	2.856	3.470	3.55	3.052	3.81	2.218	2.461	2.775	2.464	2.405
November	1.613	1.407	1.70	1.505	1.397	1.769	3.021	3.444	3.549	3.084	3.566	2.129	2.445	2.775	2.481	2.433
December	1.611	1.399	1.725	1.463	1.366	1.941	3.278	3.441	3.461	3.11	3.114	2.107	2.439	2.775	2.540	2.450
Average	*1.662*	*1.542*	*1.529*	*1.663*	*1.434*	*1.534*	*2.671*	*4.188*	*3.542*	*3.115*	*3.675*	*2.532*	*2.220*	*2.738*	*2.609*	*2.465*

Billets and Finished Steel

Bessemer Steel Billets at Pittsburgh, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$27.50	$23.00	$20.00	$28.30	$20.13	$19.25	$32.00	$63.00	$47.50	$43.50	$48.00	$43.50	$28.00	$37.30	$40.00	$37.00
February	27.50	23.00	20.00	28.50	21.00	19.50	33.50	65.00	47.50	43.50	55.25	42.25	28.00	39.63	40.00	37.00
March	27.50	23.00	19.75	28.50	21.00	19.70	42.40	66.25	47.50	42.25	60.00	38.40	28.00	44.38	40.00	36.70
April	26.75	23.00	20.00	28.50	20.80	20.00	45.00	73.75	47.50	38.50	60.00	37.50	29.50	45.00	40.00	35.50
May	26.12	22.60	20.80	27.37	20.00	20.00	45.00	86.00	47.50	38.50	60.00	37.00	34.00	44.60	38.50	35.25
June	25.30	21.00	20.87	26.50	19.50	20.50	43.50	98.75	47.50	38.50	61.00	37.00	35.00	42.63	38.00	35.00
July	25.00	21.00	21.50	26.60	19.00	21.38	41.00	100.00	47.50	38.50	62.50	32.25	35.00	42.50	38.00	35.00
August	24.62	21.00	22.12	26.00	20.25	23.13	44.20	86.00	47.50	38.50	61.00	29.60	36.10	42.50	37.75	35.00
September	24.40	20.75	23.62	24.87	21.00	24.10	45.00	66.25	47.50	38.50	58.74	29.00	39.50	41.88	36.40	35.00
October	23.75	20.00	26.00	23.30	20.00	24.63	46.25	49.38	47.50	38.50	55.00	29.00	40.00	40.00	35.75	34.25
November	23.30	19.50	27.00	21.00	19.25	26.50	52.00	47.50	47.50	41.38	49.70	29.00	37.75	40.00	35.50	34.75
December	23.00	19.25	27.00	20.00	19.00	30.60	57.50	47.50	45.50	46.00	43.50	29.00	36.50	40.00	36.00	35.00
Average	*25.40*	*21.43*	*22.39*	*25.79*	*20.08*	*22.44*	*43.95*	*70.78*	*47.33*	*40.51*	*56.22*	*34.46*	*33.95*	*41.70*	*37.99*	*35.23*

Open-Hearth Steel Billets at Pittsburgh, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$28.00	$23.00	$20.00	$28.80	$20.25	$19.25	$33.00	$63.00	$47.50	$43.50	$48.00	$43.50	$28.00	$37.50	$40.00	$38.00
February	28.75	23.00	20.00	29.00	21.00	19.50	34.75	65.00	47.50	43.50	55.25	41.00	28.00	39.63	40.00	38.00
March	29.00	23.00	19.39	29.00	21.00	19.70	42.60	66.25	47.50	42.25	60.00	38.50	28.00	44.39	40.00	36.70
April	28.63	23.00	20.00	29.00	20.80	20.00	45.00	73.75	47.50	38.50	60.00	37.50	29.50	45.00	40.00	35.50
May	28.00	22.60	20.25	27.63	20.00	20.00	43.40	86.00	47.50	38.50	60.00	37.00	34.00	45.00	38.50	35.25
June	28.00	21.00	20.75	26.50	19.40	20.50	41.50	98.75	47.50	38.50	61.00	37.00	35.00	42.63	38.00	35.00
July	26.39	21.00	21.63	26.60	19.00	21.88	42.75	100.00	47.50	38.50	65.00	32.25	35.00	42.50	38.00	35.00
August	25.75	21.00	22.63	25.39	20.25	23.50	45.00	82.50	47.50	38.50	61.00	29.60	35.50	42.50	37.75	35.00
September	24.88	20.50	24.13	24.13	21.00	24.60	45.00	66.25	47.50	38.50	58.75	29.00	39.50	41.88	36.40	35.00
October	24.39	19.00	26.70	23.30	20.00	25.25	46.25	50.50	47.50	38.50	55.00	29.00	40.00	40.00	35.75	34.25
November	23.30	19.00	27.50	21.00	19.25	27.25	52.00	47.50	47.50	41.39	49.70	29.00	37.75	40.00	35.50	34.75
December	23.00	19.25	27.75	20.00	19.00	31.80	57.50	47.50	45.50	46.40	43.50	29.00	36.50	40.00	36.00	35.00
Average	*26.51*	*21.28*	*22.56*	*25.87*	*20.08*	*22.77*	*44.06*	*70.58*	*47.33*	*40.54*	*56.43*	*34.36*	*33.90*	*41.75*	*37.99*	*35.62*

Wire Rods at Pittsburgh

No. 5 Bessemer wire rods, per gross ton. The quotations for November and December, 1917, and all of 1918, are Government prices and apply also to open-hearth rods

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$33.00	$28.00	$24.37	$30.00	$25.50	$25.00	$43.00	75.00	$57.00	$57.00	$60.00	$57.00	$36.00	$47.00	$51.00	$48.00
February	33.00	28.75	25.00	30.00	26.38	25.00	48.00	77.50	57.00	57.00	63.75	54.50	35.75	49.38	51.00	48.00
March	33.00	29.00	25.00	30.00	26.50	25.00	54.80	81.00	57.00	55.75	70.00	52.00	36.00	50.00	51.00	48.00
April	32.50	29.00	25.00	30.00	26.00	25.00	60.00	85.00	57.00	52.00	70.00	49.00	38.00	50.25	51.00	47.00
May	32.00	29.00	25.00	30.00	25.50	25.00	60.00	86.00	57.00	52.00	72.50	48.00	38.00	51.00	48.75	46.00
June	30.80	28.25	25.00	29.50	24.50	25.00	53.75	92.50	57.00	52.00	75.00	48.00	38.50	51.00	48.00	45.60
July	29.25	27.00	25.00	28.30	24.50	25.63	53.75	96.25	57.00	52.00	75.00	43.00	40.00	51.00	48.00	45.00
August	28.25	27.00	25.80	28.00	25.00	27.00	55.00	94.00	57.00	52.00	75.00	41.80	42.40	51.00	46.50	45.00
September	28.00	27.00	27.00	27.37	26.20	29.40	55.00	88.75	57.00	52.00	75.00	39.50	46.25	51.00	46.00	45.00
October	28.50	26.00	28.50	26.60	25.88	31.75	55.00	77.25	57.00	52.00	75.00	40.50	45.00	51.00	45.50	45.00
November	28.12	25.30	29.75	25.87	25.25	36.25	63.00	57.00	57.00	54.50	66.40	40.00	45.00	51.00	45.00	45.00
December	28.00	24.50	30.00	25.17	25.00	39.50	68.75	57.00	57.00	59.50	57.00	38.00	45.00	51.00	48.00	45.00
Average	*30.37*	*27.40*	*26.29*	*28.40*	*25.52*	*28.29*	*55.84*	*79.77*	*57.00*	*53.98*	*69.55*	*45.94*	*40.49*	*50.39*	*48.31*	*46.05*

Plain Wire, Base, at Pittsburgh, Cents per Pound

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	1.65	1.51	1.37	1.55	1.35	1.34	1.98	2.95	3.25	3.25	3.25	3.25	2.25	2.45	2.75	2.60
February	1.65	1.55	1.40	1.55	1.40	1.39	2.10	2.95	3.25	3.25	3.50	3.13	2.20	2.63	2.75	2.60
March	1.65	1.57	1.40	1.56	1.40	1.40	2.25	3.11	3.25	3.19	3.50	3.00	2.25	2.65	2.75	2.60
April	1.65	1.60	1.40	1.60	1.40	1.37	2.25	3.23	3.25	3.00	3.50	3.00	2.25	2.68	2.75	2.50
May	1.64	1.60	1.40	1.60	1.36	1.35	2.45	3.45	3.25	3.00	3.50	3.00	2.25	2.75	2.68	2.50
June	1.60	1.55	1.40	1.60	1.30	1.35	2.45	3.70	3.25	3.00	3.50	2.75	2.25	2.75	2.65	2.49
July	1.55	1.50	1.42	1.58	1.32	1.39	2.45	3.95	3.25	3.00	3.50	2.56	2.25	2.75	2.63	2.50
August	1.50	1.50	1.46	1.48	1.36	1.43	2.53	3.95	3.25	3.00	3.69	2.50	2.29	2.75	2.56	2.50
September	1.50	1.46	1.50	1.47	1.40	1.54	2.55	3.95	3.25	3.00	3.75	2.58	2.39	2.75	2.53	2.50
October	1.50	1.44	1.50	1.41	1.40	1.65	2.60	3.25	3.25	3.17	3.75	2.60	2.45	2.75	2.50	2.50
November	1.50	1.37	1.50	1.39	1.39	1.72	2.80	3.25	3.25	3.29	3.65	2.56	2.45	2.75	2.50	2.50
December	1.50	1.34	1.53	1.35	1.31	1.89	2.95	3.25	3.25	3.21	3.25	2.44	2.45	2.75	2.60	2.50
Average	*1.57*	*1.50*	*1.44*	*1.51*	*1.37*	*1.48*	*2.47*	*3.43*	*3.25*	*3.11*	*3.53*	*2.78*	*2.31*	*2.70*	*2.64*	*2.52*

Wire Nails at Pittsburgh, Dollars per Keg of 100 Lb.

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$1.85	$2.00	$2.05	$1.95	$1.85	$1.71	$1.57	$1.75	$1.54	$1.54	$2.13	$3.00	$3.50	$3.50	$4.50	$3.25	$2.50	$2.70	$3.00	$2.85
February	1.85	2.00	2.05	1.95	1.85	1.75	1.60	1.75	1.60	1.57	2.25	3.00	3.50	3.50	4.50	3.21	2.40	2.78	3.00	2.85
March	1.85	2.00	2.05	1.95	1.85	1.79	1.60	1.76	1.60	1.60	2.40	3.20	3.50	3.44	4.00	3.02	2.40	2.83	3.00	2.85
April	1.85	2.00	2.05	1.87	1.85	1.80	1.60	1.80	1.60	1.56	2.40	3.28	3.50	3.25	4.00	3.13	2.40	2.93	3.00	2.80
May	1.85	2.00	2.05	1.65	1.82	1.80	1.60	1.80	1.56	1.55	2.50	3.50	3.50	3.25	4.00	3.05	2.40	3.00	2.93	2.75
June	1.85	2.00	1.97	1.70	1.80	1.75	1.60	1.80	1.50	1.55	2.50	3.75	3.50	3.25	4.00	3.00	2.40	3.00	2.90	2.68
July	1.84	2.00	1.95	1.72	1.75	1.70	1.62	1.70	1.52	1.60	2.50	4.00	3.50	3.25	4.00	2.81	2.40	3.00	2.88	2.65
August	1.82	2.00	1.95	1.80	1.70	1.69	1.66	1.65	1.56	1.61	2.58	4.00	3.50	3.25	4.25	2.75	2.48	3.00	2.81	2.65
September	1.86	2.05	1.95	1.80	1.70	1.65	1.70	1.65	1.60	1.69	2.60	4.00	3.50	3.25	4.25	2.86	2.63	3.00	2.78	2.65
October	1.85	2.05	1.95	1.80	1.70	1.64	1.70	1.63	1.60	1.80	2.63	...	3.50	3.31	4.25	2.90	2.70	3.00	2.75	2.63
November	1.88	2.05	1.95	1.80	1.70	1.55	1.70	1.59	1.50	1.87	2.85	3.50	3.50	3.50	4.05	2.84	2.70	3.00	2.75	2.65
December	2.00	2.05	1.95	1.85	1.70	1.53	1.72	1.55	1.51	2.04	3.00	3.50	3.50	4.12	3.25	2.69	2.70	3.00	2.85	2.65
Average	*1.86*	*2.02*	*1.99*	*1.82*	*1.77*	*1.70*	*1.64*	*1.70*	*1.56*	*1.67*	*2.53*	*3.52*	*3.50*	*3.41*	*4.09*	*2.96*	*2.51*	*2.94*	*2.89*	*2.72*

Steel Rails at Mill, Dollars per Gross Ton

Bessemer rails to end of 1913; open-hearth rails from beginning of 1914

The extra $2 per gross ton, which has for many years been charged for open-hearth rails, was annulled with the rail price announced Oct. 22, 1921

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$28.00	$28.00	$28.00	$28.00	$30.00	$30.00	$30.00	$40.00	$57.00	$57.00	$47.00	$47.00	$40.00	$43.00	$43.00	$43.00
February	28.00	28.00	28.00	28.00	30.00	30.00	30.00	40.00	57.00	57.00	47.00	47.00	40.00	43.00	43.00	43.00
March	28.00	28.00	28.00	28.00	30.00	30.00	30.00	40.00	57.00	54.50	49.50	47.00	40.00	43.00	43.00	43.00
April	28.00	28.00	28.00	28.00	30.00	30.00	30.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
May	28.00	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
June	28.00	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
July	28.00	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
August	28.00	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
September	28.00	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
October	28.00	28.00	28.00	28.00	30.00	30.00	35.00	....	57.00	47.00	57.00	45.25	43.00	43.00	43.00	43.00
November	28.00	28.00	28.00	28.00	30.00	30.00	38.00	....	57.00	47.00	57.00	40.00	43.00	43.00	43.00	43.00
December	28.00	28.00	28.00	28.00	30.00	30.00	40.00	....	57.00	47.00	53.00	40.00	43.00	43.00	43.00	43.00
Average	*28.00*	*28.00*	*28.00*	*28.00*	*30.00*	*30.00*	*34.00*	*40.00*	*57.00*	*49.29*	*54.38*	*45.69*	*40.75*	*43.00*	*43.00*	*43.00*

1924	1925
2.40	2.10
2.40	2.10
2.40	2.10
2.29	2.05
2.24	2.00
2.20	2.00
2.15	2.00
2.13	1.95
2.04	1.92
2.00	2.00
2.03	2.00
2.10	2.00
2.20	*2.02*

1924	1925
2.50	2.00
2.45	2.00
2.39	2.00
2.28	2.00
2.20	2.00
2.18	1.92
2.09	1.90
1.95	1.85
1.82	1.80
1.80	1.80
1.83	1.86
1.92	1.90
2.12	*1.91*

1924	1925
2.50	2.10
2.50	2.10
2.39	2.10
2.29	2.05
2.24	2.00
2.20	2.00
2.09	2.00
2.00	1.95
2.00	1.90
1.93	1.90
2.00	1.90
2.10	1.90
2.19	*1.99*

1924	1925
3.83	3.60
3.85	3.50
3.78	3.44
3.71	3.35
3.60	3.20
3.53	3.15
3.46	3.13
3.45	3.15
3.50	3.14
3.50	3.11
3.50	3.25
3.54	3.33
3.60	*3.28*

age, Cents

924	1925
3.00	2.70
3.00	2.70
2.93	2.69
2.86	2.53
2.80	2.40
2.76	2.31
2.68	2.30
2.63	2.30
2.69	2.25
2.70	2.26
2.70	2.40
2.70	2.50
2.79	2.45

1924	1925
3.00	2.25
3.00	2.35
2.93	2.40
2.75	2.40
2.75	2.20
2.50	2.20
2.50	2.20
2.35	2.20
2.25	2.20
2.25	2.23
2.25	2.30
2.25	2.30
2.57	2.27

Mahoning and Shenango Valley No. 2 Foundry Iron, at Furnace, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.00	$13.75	$13.00	$17.50	$12.85	$13.00	$18.50	$31.00	$33.00	$31.00	$39.40	$31.88	$19.30	$27.00	$22.50	$22.38
February	16.69	13.75	13.00	17.00	13.19	13.00	18.31	32.00	33.00	31.00	41.50	28.00	18.88	27.50	23.00	22.00
March	16.10	13.75	13.12	16.69	13.25	13.00	18.50	34.75	33.00	29.94	41.25	25.90	19.00	30.50	23.00	21.10
April	15.62	13.75	13.25	15.55	13.25	12.75	18.50	39.75	33.00	26.75	42.80	24.75	20.75	31.00	21.80	20.13
May	15.31	13.75	13.25	14.62	13.00	12.94	18.20	42.40	33.00	26.75	44.25	23.50	23.80	30.20	20.75	19.13
June	14.75	13.56	13.25	14.06	13.00	12.69	18.13	50.25	33.00	26.75	45.00	22.10	24.00	27.63	19.63	18.30
July	14.31	13.50	13.37	13.87	13.00	12.70	18.25	54.50	33.00	26.75	45.00	20.13	24.25	25.50	19.00	18.50
August	14.15	13.50	13.69	14.00	13.00	13.62	18.25	53.20	33.00	26.75	47.00	19.63	32.60	24.88	19.13	18.50
September	13.75	13.44	14.44	14.00	13.00	14.70	18.39	47.00	33.00	26.75	49.40	21.00	34.88	24.75	19.80	18.80
October	13.94	13.37	16.10	13.84	12.90	14.87	20.00	33.00	34.00	26.75	46.50	21.00	31.80	23.60	19.50	19.13
November	13.90	13.20	16.94	13.50	12.75	15.50	25.00	33.00	34.00	31.50	40.25	20.75	27.88	21.88	19.50	20.39
December	13.75	13.00	17.25	13.50	12.75	18.30	30.75	33.00	34.00	36.75	36.20	20.00	25.63	22.00	21.20	20.56
Average	*14.94*	*13.53*	*14.22*	*14.84*	*13.00*	*13.92*	*20.07*	*40.32*	*33.25*	*28.95*	*43.21*	*23.22*	*25.23*	*26.37*	*20.73*	*19.90*

Gray Forge Pig Iron, Philadelphia and Vicinity, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.25	$14.25	$14.25	$17.65	$14.00	$13.50	$18.44	$28.38	$32.00	$33.90	$40.23	$32.78	$20.60	$27.85	$22.81	$24.00
February	17.50	14.25	14.25	17.31	14.00	13.44	19.00	29.75	32.00	33.90	40.50	30.90	20.50	28.37	22.50	23.63
March	16.90	14.60	14.25	16.87	14.00	13.25	19.00	31.94	32.00	32.84	43.00	26.86	20.50	29.62	22.12	23.40
April	16.62	14.75	14.37	16.56	14.00	13.25	19.13	38.50	32.00	29.65	43.00	25.26	21.25	30.37	22.00	22.63
May	16.00	14.70	14.50	15.81	13.81	13.25	19.50	40.40	32.00	29.21	43.00	25.26	23.80	29.50	22.00	21.50
June	15.65	14.50	14.62	15.37	13.75	13.25	19.25	44.31	32.00	26.25	43.00	24.69	24.25	28.00	22.00	21.50
July	15.37	14.50	14.87	14.95	13.75	13.25	18.50	50.05	32.00	25.92	43.00	22.50	25.50	26.90	21.20	21.50
August	15.00	14.30	15.37	14.62	13.75	14.50	18.50	49.56	32.00	26.60	45.46	21.20	29.00	25.50	21.00	21.00
September	14.75	14.45	15.87	14.56	13.75	15.13	18.50	44.25	32.00	27.00	47.10	20.00	31.00	25.50	21.00	21.00
October	14.50	14.25	16.87	15.00	13.62	15.25	19.35	32.20	36.60	28.69	47.10	20.50	31.00	24.20	21.00	21.25
November	14.37	14.25	17.62	14.75	13.50	16.05	23.75	32.00	36.60	32.40	44.64	22.50	29.14	23.00	21.37	22.00
December	14.25	14.25	17.75	14.58	13.50	17.63	27.69	32.00	36.90	36.10	38.74	21.69	28.14	23.00	23.10	23.00
Average	*15.67*	*14.42*	*15.38*	*15.67*	*13.79*	*14.31*	*20.05*	*37.78*	*33.18*	*30.21*	*43.23*	*24.51*	*25.39*	*26.82*	*21.84*	*22.20*

Malleable Pig Iron at Chicago, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$19.00	$15.50	$14.35	$17.90	$13.88	$13.00	$19.00	$30.94	$33.50	$31.50	$40.50	$32.00	$18.90	$28.90	$23.38	$24.00
February	19.00	15.50	14.14	17.31	13.94	13.00	19.00	31.75	33.50	31.50	42.75	29.38	19.13	29.75	24.50	24.00
March	18.40	15.50	14.00	17.25	14.25	13.00	19.40	35.40	33.50	30.44	43.50	25.80	20.00	31.25	24.38	24.00
April	17.50	15.25	14.00	17.05	14.25	13.00	19.50	39.00	33.50	27.25	43.50	24.00	20.50	32.00	24.10	22.63
May	17.06	15.00	14.40	16.00	14.06	13.00	19.50	43.60	33.50	27.25	43.50	23.00	22.60	32.00	22.75	21.25
June	16.75	15.00	14.50	15.62	13.88	13.00	19.50	50.25	33.50	27.25	43.50	21.50	23.25	31.25	21.25	20.60
July	16.56	15.00	14.50	14.65	14.00	13.00	19.50	55.00	33.50	27.25	45.25	19.00	24.25	27.90	19.60	20.50
August	16.50	14.80	15.10	15.00	14.00	13.44	19.00	55.00	33.50	27.25	46.50	19.60	28.60	27.00	20.38	20.50
September	16.40	14.50	16.25	15.00	13.25	14.30	19.00	54.75	33.50	27.25	46.50	21.75	32.00	26.75	20.50	21.00
October	16.06	14.50	17.10	15.20	13.00	15.25	19.88	33.50	34.50	28.25	45.75	21.00	31.40	25.00	20.50	21.63
November	16.00	14.35	17.87	14.87	12.88	17.13	25.80	33.50	34.50	31.50	39.90	20.60	29.75	23.13	20.88	22.75
December	16.00	14.35	18.00	14.63	12.90	18.20	29.50	33.50	34.50	39.50	35.00	19.63	28.00	23.00	22.62	23.00
Average	*17.10*	*14.94*	*15.35*	*15.87*	*13.69*	*14.11*	*20.72*	*41.35*	*33.75*	*29.68*	*43.01*	*23.11*	*24.87*	*28.16*	*22.11*	*22.15*

Lake Superior Charcoal Pig Iron at Chicago, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$19.50	$17.87	$16.00	$18.15	$15.25	$15.75	$19.50	$31.75	$37.50	$38.85	$48.75	$42.50	$31.10	$33.15	$29.15	$29.04
February	19.50	17.50	15.95	18.00	15.25	15.75	19.75	33.75	37.50	38.85	58.38	39.50	29.38	33.90	29.15	29.04
March	19.30	17.50	15.75	18.00	15.25	15.75	19.75	36.75	37.50	38.85	58.20	38.50	26.00	35.40	29.15	29.04
April	19.00	17.50	15.75	18.00	15.45	15.75	19.75	40.25	37.50	31.75	57.25	38.50	26.50	36.53	29.15	29.04
May	18.62	17.25	15.75	18.00	15.75	15.75	19.75	48.15	37.50	31.75	57.50	37.50	28.40	36.65	29.15	29.04
June	18.50	16.80	16.75	16.81	15.75	15.75	19.75	52.88	37.62	31.75	57.50	37.50	29.75	36.65	29.12	29.04
July	18.50	16.50	16.25	15.65	15.75	15.75	19.75	57.75	38.00	31.75	57.50	36.37	31.65	34.81	29.04	29.04
August	18.50	16.50	16.25	14.69	15.75	16.00	19.75	58.00	38.00	32.25	57.70	33.60	34.05	32.04	29.04	29.04
September	18.40	16.50	17.12	15.25	15.75	15.85	19.75	58.00	38.00	32.75	58.50	33.00	36.15	32.04	29.04	29.04
October	18.12	16.50	18.65	15.25	15.75	15.75	20.25	37.50	38.00	33.44	58.50	31.50	36.15	29.86	29.04	29.04
November	18.00	16.50	18.65	15.25	15.75	17.00	26.46	37.50	38.70	38.50	55.75	31.50	36.15	28.40	29.04	29.04
December	18.00	16.37	18.75	15.25	15.75	18.65	31.75	37.50	38.70	43.00	49.13	31.50	34.65	29.15	29.04	29.04
Average	*18.66*	*16.94*	*16.80*	*16.53*	*15.60*	*16.13*	*21.33*	*44.15*	*37.88*	*35.29*	*56.22*	*35.96*	*31.66*	*33.22*	*29.09*	*29.04*

No. 2 Foundry Pig Iron at Buffalo, (at Furnace) per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$16.94	$14.00	$13.50	$17.43	$12.85	$12.89	$18.75	$34.94	$33.00	$31.00	$40.90	$32.38	$19.44	$26.94	$22.25	$23.00
February	17.00	13.69	13.50	17.06	12.94	13.00	18.53	35.25	33.00	31.00	42.00	30.50	18.87	27.56	22.25	22.75
March	16.95	14.06	13.63	16.70	13.22	12.41	18.72	38.45	33.00	29.94	44.75	29.00	18.30	29.05	21.81	22.12
April	16.31	13.75	13.56	16.22	13.50	12.80	18.88	42.62	33.00	26.75	45.00	26.15	20.81	29.56	21.37	20.65
May	16.00	13.69	13.50	15.18	13.41	12.88	18.78	44.95	33.00	26.75	45.00	25.62	22.62	29.40	20.25	19.00
June	15.25	13.39	13.38	14.32	13.13	12.87	18.65	48.31	33.00	26.75	44.75	23.42	23.05	29.06	19.37	19.00
July	14.69	13.25	14.03	13.83	13.05	12.70	18.70	52.25	33.00	26.63	45.00	20.87	24.50	26.00	19.00	18.85
August	14.25	13.50	14.50	13.98	13.25	13.85	18.63	53.00	33.00	27.77	47.75	19.50	30.70	24.95	19.19	18.72
September	14.25	13.69	15.50	14.09	13.22	14.90	19.00	53.00	33.00	28.25	50.10	20.00	33.94	24.87	19.37	18.75
October	14.19	13.10	16.62	14.00	12.72	15.63	20.37	33.00	34.00	28.70	47.44	20.37	31.12	23.06	19.05	19.40
November	14.30	13.06	17.25	13.69	12.44	16.28	27.25	33.00	34.00	34.30	42.56	19.12	27.80	20.87	20.50	21.19
December	14.50	13.25	17.56	12.87	12.95	18.13	32.75	33.00	34.00	38.25	36.60	19.30	25.50	21.56	22.62	21.50
Average	*15.39*	*13.54*	*14.75*	*14.95*	*13.06*	*14.03*	*20.75*	*41.81*	*33.25*	*29.67*	*44.32*	*23.85*	*24.72*	*26.07*	*20.59*	*20.41*

No. 2 Foundry Pig Iron at Cleveland, (Delivered Consumer) per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.83	$14.25	$13.25	$17.87	$13.50	$13.44	$19.30	$31.10	$33.30	$31.40	$40.00	$33.40	$20.06	$27.87	$23.70	$23.87
February	17.48	14.13	13.25	17.53	13.82	13.50	19.23	32.93	33.30	31.40	41.90	30.22	20.06	29.00	24.50	23.99
March	16.82	14.13	13.25	17.16	14.25	13.47	19.05	37.06	33.30	30.58	43.15	27.80	21.55	32.15	24.50	23.47
April	16.34	14.25	13.25	16.39	14.25	13.38	19.36	40.27	33.30	27.15	43.40	26.62	20.81	32.52	24.25	22.82
May	16.18	14.25	13.30	15.62	14.38	13.38	19.45	42.90	33.30	27.15	44.53	25.50	23.75	32.21	23.25	20.87
June	15.46	14.25	13.56	14.96	14.25	13.28	19.07	50.63	33.32	27.15	44.90	24.00	24.06	30.46	21.50	20.12
July	15.14	13.94	13.81	14.69	13.75	13.20	18.79	55.80	33.40	27.15	45.20	21.31	24.75	27.44	20.25	20.00
August	14.55	13.75	14.19	14.68	13.75	14.32	18.76	55.17	33.40	27.40	48.06	20.50	31.31	26.40	20.56	20.00
September	14.50	13.75	15.45	14.75	13.75	15.27	18.92	53.15	33.40	27.65	49.86	20.75	35.94	25.87	20.81	20.00
October	14.31	13.70	16.85	14.83	13.73	15.43	20.12	33.30	34.40	28.15	47.88	20.75	34.09	25.25	21.00	20.55
November	14.15	13.25	17.59	14.40	13.51	16.61	26.20	33.30	34.40	31.90	43.46	20.56	30.47	23.35	21.31	22.32
December	14.25	13.25	17.87	13.78	13.27	18.18	31.13	33.30	34.40	36.90	36.32	19.95	27.25	23.06	22.39	22.26
Average	*15.58*	*13.91*	*14.64*	*15.56*	*13.85*	*14.46*	*20.78*	*41.58*	*33.60*	*29.67*	*44.06*	*24.28*	*26.18*	*27.97*	*22.34*	*21.69*

Southern No. 2 Foundry Pig Iron at Birmingham, Dollars per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$14.13	$11.00	$10.00	$13.56	$10.63	$9.50	$15.00	$23.20	$33.00	$31.00	$38.75	$32.25	$16.20	$23.25	$21.50	$20.00
February	14.00	11.00	10.06	13.38	10.56	9.50	15.00	24.63	33.00	31.00	40.00	28.13	15.00	24.38	22.50	20.00
March	13.42	11.00	10.25	13.06	10.70	9.35	15.00	29.00	33.00	29.44	40.00	25.30	15.00	26.40	22.50	20.00
April	12.75	11.00	10.55	12.40	10.50	9.44	15.00	34.50	33.00	26.75	40.50	23.50	15.88	27.00	22.30	20.00
May	12.00	10.70	10.94	11.69	10.50	9.44	15.00	39.00	33.00	26.75	42.00	22.20	17.60	26.85	21.50	20.00
June	12.00	10.19	11.00	10.81	10.35	9.65	14.50	42.25	33.00	25.25	42.00	21.88	18.38	25.75	20.00	19.60
July	12.00	10.00	11.45	10.50	10.00	9.75	14.00	47.00	33.00	25.15	42.00	20.25	18.25	25.00	18.00	18.00
August	11.50	10.20	11.81	10.81	10.00	10.75	13.80	47.00	33.00	27.38	42.00	19.00	20.10	23.70	17.50	18.00
September	11.50	10.06	12.75	11.00	10.00	11.50	14.38	47.00	33.00	27.95	42.00	19.00	26.00	22.75	17.50	18.50
October	11.50	10.00	13.50	11.25	10.00	12.13	15.50	33.00	34.00	28.00	42.00	19.00	26.80	20.63	17.50	19.38
November	11.00	9.94	14.00	10.63	10.00	13.40	20.13	33.00	34.00	30.75	38.00	18.40	23.50	19.60	17.75	21.00
December	11.00	9.94	14.00	10.70	9.60	14.38	23.00	33.00	33.40	35.20	38.00	17.33	22.88	21.00	19.80	22.00
Average	*13.23*	*10.42*	*11.69*	*11.65*	*10.24*	*10.73*	*15.86*	*36.05*	*33.20*	*28.72*	*40.60*	*22.19*	*19.63*	*23.86*	*19.86*	*19.71*

Bessemer Pig Iron, per Gross Ton, at Valley Furnace

	1920	1921	1922	1923	1924	1925
January	$38.60	$32.00	$19.60	$27.50	$23.00	$22.88
February	41.50	29.00	19.50	28.06	23.50	22.75
March	42.00	26.20	19.50	30.25	23.38	22.30
April	42.20	25.00	20.63	31.00	22.80	21.13
May	42.63	24.20	24.40	30.10	22.13	20.00
June	43.00	22.75	25.00	28.50	21.13	19.00
July	45.60	20.88	25.00	26.70	20.20	19.00
August	47.39	20.00	28.20	26.50	20.00	19.00
September	48.50	20.00	33.50	26.50	20.00	19.30
October	47.25	20.00	33.40	25.20	20.00	19.63
November	40.25	20.00	31.75	23.25	20.38	20.88
December	35.00	20.00	28.13	22.88	21.90	21.00
Average	*42.82*	*23.34*	*25.63*	*27.20*	*21.53*	*20.57*

Basic Pig Iron, per Gross Ton, Delivered Eastern Pennsylvania

	1920	1921	1922	1923	1924	1925
January	$39.19	$33.51	$20.18	$27.80	$23.00	$24.25
February	41.90	30.65	19.84	28.19	22.69	23.88
March	44.24	26.15	22.61	29.56	21.81	23.56
April	44.80	25.00	21.00	30.81	21.50	22.31
May	44.80	25.00	24.00	30.60	21.00	21.13
June	44.66	24.63	25.00	28.14	21.00	21.50
July	43.70	22.38	25.75	26.60	20.20	21.50
August	47.21	19.70	27.23	25.00	20.00	20.50
September	51.26	19.19	30.83	25.00	20.00	20.70
October	49.60	20.50	29.30	24.20	20.00	21.25
November	41.94	20.70	27.83	22.88	21.13	22.39
December	44.15	20.63	27.31	23.13	23.41	23.00
Average	*44.79*	*24.00*	*25.08*	*26.83*	*21.31*	*22.16*

Malleable Pig Iron, per Gross Ton, f.o.b. Valley Furnace

	1920	1921	1922	1923	1924	1925
January	$39.25	$32.00	$19.50	$27.00	$22.39	$22.39
February	42.75	28.75	19.00	27.63	23.00	22.00
March	42.40	25.80	19.00	30.50	22.50	21.50
April	43.25	25.00	19.50	31.00	22.10	20.63
May	43.88	24.10	24.20	30.20	21.00	19.25
June	44.20	22.75	24.50	28.13	19.88	18.50
July	45.00	20.88	25.13	25.40	19.00	18.50
August	48.40	20.00	29.50	24.50	19.13	18.50
September	50.00	20.13	33.50	24.50	19.80	18.80
October	49.00	20.50	32.70	23.30	19.50	19.13
November	39.30	20.20	29.00	20.88	19.75	20.38
December	35.00	20.00	26.25	20.00	21.20	20.50
Average	*43.53*	*23.34*	*25.15*	*26.09*	*20.77*	*20.01*

Virginia No. 2X Foundry Pig Iron, Delivered Eastern Pennsylvania (Per Gross Ton)

	1920	1921	1922	1923	1924	1925
January	$45.35	$40.49	$27.84	$32.97	$30.17	$29.67
February	47.35	37.24	27.61	33.17	30.52	29.67
March	47.55	34.59	27.24	33.79	30.67	29.67
April	48.85	32.99	27.74	34.67	30.67	29.67
May	49.85	32.99	28.24	35.07	30.67	29.17
June	50.15	32.99	28.24	33.17	30.67	29.17
July	50.10	31.86	30.17	32.27	29.87	29.17
August	54.90	29.94	30.17	31.42	28.67	29.17
September	55.48	28.49	36.17	30.92	28.67	28.77
October	54.74	28.24	38.17	30.17	28.67	28.17
November	50.59	28.24	37.17	30.17	28.67	28.17
December	43.50	28.24	33.92	30.17	29.27	28.17
Average	*49.87*	*32.19*	*31.06*	*32.83*	*29.77*	*29.05*

Gray Forge Pig Iron, per Gross Ton, f.o.b. Valley Furnace

	1920	1921	1922	1923	1924	1925
January	$37.60	$30.88	$19.00	$26.50	$22.00	$21.88
February	40.75	27.00	18.81	27.00	22.00	21.50
March	41.00	24.70	18.75	30.00	22.00	20.60
April	41.00	23.75	20.44	30.50	21.40	19.63
May	41.75	22.40	23.30	29.70	20.25	18.63
June	42.25	20.88	23.50	26.63	19.13	17.80
July	43.00	19.13	23.75	25.00	18.50	18.00
August	44.50	18.90	29.45	24.00	18.63	18.00
September	49.00	20.00	34.13	24.00	19.30	18.30
October	45.50	20.00	31.10	23.30	19.00	18.63
November	39.25	19.70	27.63	21.39	19.00	19.88
December	35.20	19.25	25.25	21.50	20.70	20.00
Average	*41.73*	*22.21*	*24.59*	*25.79*	*20.16*	*19.39*

Standard Low-Phosphorus Pig Iron at Furnace in Eastern Pennsylvania (Per Gross Ton)

	1920	1921	1922	1923	1924	1925
January	$48.25	$42.63	$30.00	$35.00	$27.10	$25.50
February	49.50	41.50	30.00	35.00	27.00	25.50
March	50.00	41.50	30.00	35.00	27.00	25.10
April	50.00	38.75	30.00	35.00	25.80	24.75
May	51.00	38.00	30.00	33.20	24.75	24.00
June	52.40	38.00	30.00	30.50	24.75	23.00
July	54.00	38.00	30.00	29.00	24.00	22.00
August	57.00	36.80	33.00	29.00	24.00	22.00
September	60.00	36.50	38.00	28.50	24.00	22.00
October	60.00	36.50	38.00	28.00	23.75	22.00
November	60.00	36.50	38.00	27.88	23.88	24.00
December	48.00	34.87	35.00	27.50	25.30	24.00
Average	*53.35*	*38.25*	*32.67*	*31.13*	*25.11*	*23.65*

THE IRON AGE Composite Iron and Steel Prices

Composite Pig Iron Price

Average of THE IRON AGE quotations on foundry and basic pig irons; basic iron at Valley furnace; foundry iron an average of Chicago, Birmingham and Philadelphia. Quoted in dollars per gross ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.12	$13.63	$12.65	$16.49	$12.76	$12.38	$17.81	$28.88	$33.21	$31.36	$39.08	$31.18	$18.48	$26.78	$22.15	$22.44
February	16.77	13.83	12.61	16.81	13.18	12.38	17.76	29.75	33.21	31.36	42.35	28.45	18.14	27.20	22.84	22.50
March	16.29	13.88	12.93	16.07	13.16	12.34	18.06	32.18	33.21	30.10	42.17	25.18	18.35	30.11	22.81	21.99
April	15.97	13.79	13.09	15.74	13.13	12.37	18.15	38.56	32.71	27.11	42.93	23.73	20.00	30.83	22.31	20.95
May	15.27	13.53	13.27	14.98	13.06	12.37	18.08	41.87	32.71	26.91	43.64	22.78	23.35	29.74	21.40	19.85
June	14.90	13.27	13.36	14.35	12.97	12.45	17.91	47.95	32.71	26.46	44.09	21.73	23.95	28.23	20.27	19.22
July	14.72	13.21	13.68	13.99	12.92	12.55	17.79	52.11	32.73	26.37	45.44	20.22	23.86	25.96	19.31	18.96
August	14.39	13.12	14.15	13.93	12.91	13.55	17.63	51.43	32.73	26.83	47.38	18.97	26.69	25.19	19.40	19.01
September	14.17	12.99	14.74	13.97	12.83	14.28	17.82	46.93	32.73	27.11	47.83	19.89	31.78	25.02	19.46	19.39
October	13.79	12.84	16.01	13.93	12.67	14.67	19.18	33.21	34.31	27.52	45.05	19.97	30.57	23.30	19.46	19.92
November	13.74	12.71	16.52	13.39	12.42	15.82	24.36	33.21	34.36	30.34	38.65	19.79	27.82	21.40	19.79	21.16
December	13.78	12.59	16.63	13.06	12.39	17.34	28.63	33.21	34.26	36.13	34.51	19.11	25.70	21.88	21.60	21.54
Average	*15.08*	*13.28*	*14.14*	*14.68*	*12.87*	*13.54*	*19.43*	*36.11*	*33.24*	*28.97*	*42.76*	*22.58*	*24.06*	*26.30*	*20.90*	*20.58*

Composite Price of Finished Steel

Average of THE IRON AGE quotations on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. Quoted in cents per pound

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	1.741	1.615	1.424	1.771	1.451	1.383	2.06	3.384	3.549	3.371	3.158	3.057	2.059	2.469	2.783	2.560
February	1.736	1.62	1.40	1.766	1.477	1.395	2.203	3.501	3.549	3.371	3.486	2.918	2.007	2.605	2.782	2.546
March	1.727	1.623	1.394	1.786	1.473	1.413	2.447	3.739	3.549	3.282	3.743	2.764	2.014	2.721	2.746	2.537
April	1.727	1.627	1.433	1.79	1.446	1.437	2.611	4.110	3.549	3.031	3.842	2.737	2.075	2.814	2.692	2.503
May	1.72	1.62	1.456	1.727	1.424	1.433	2.75	4.562	3.549	3.021	3.804	2.764	2.113	2.793	2.639	2.460
June	1.707	1.556	1.47	1.687	1.399	1.444	2.689	5.004	3.549	3.021	3.756	2.643	2.148	2.789	2.610	2.440
July	1.657	1.546	1.504	1.667	1.40	1.471	2.64	5.334	3.549	3.021	3.885	2.455	2.169	2.783	2.563	2.435
August	1.636	1.539	1.553	1.624	1.446	1.511	2.682	5.249	3.549	3.021	3.967	2.341	2.292	2.775	2.515	2.413
September	1.627	1.513	1.61	1.591	1.47	1.559	2.765	5.049	3.549	3.004	3.956	2.248	2.419	2.775	2.487	2.397
October	1.613	1.441	1.659	1.559	1.446	1.634	2.856	3.470	3.55	3.052	3.81	2.218	2.461	2.775	2.464	2.405
November	1.613	1.407	1.70	1.505	1.397	1.769	3.021	3.444	3.549	3.084	3.566	2.129	2.445	2.775	2.481	2.433
December	1.611	1.399	1.725	1.463	1.366	1.941	3.278	3.441	3.461	3.11	3.114	2.107	2.439	2.775	2.540	2.450
Average	*1.662*	*1.542*	*1.529*	*1.663*	*1.434*	*1.534*	*2.671*	*4.188*	*3.542*	*3.115*	*3.675*	*2.532*	*2.220*	*2.738*	*2.609*	*2.465*

Billets and Finished Steel

Bessemer Steel Billets at Pittsburgh, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$27.50	$23.00	$20.00	$28.30	$20.13	$19.25	$32.00	$63.00	$47.50	$43.50	$48.00	$43.50	$28.00	$37.30	$40.00	$37.00
February	27.50	23.00	20.00	28.50	21.00	19.50	33.50	65.00	47.50	43.50	55.25	42.25	28.00	39.63	40.00	37.00
March	27.50	23.00	19.75	28.50	21.00	19.70	42.40	66.25	47.50	42.25	60.00	38.40	28.00	44.38	40.00	36.70
April	26.75	23.00	20.00	28.50	20.80	20.00	45.00	73.75	47.50	38.50	60.00	37.50	29.50	45.00	40.00	35.50
May	26.12	22.60	20.80	27.37	20.00	20.00	45.00	86.00	47.50	38.50	60.00	37.00	34.00	44.60	38.50	35.25
June	25.30	21.00	20.87	26.50	19.50	20.50	43.50	98.75	47.50	38.50	61.00	37.00	35.00	42.63	38.00	35.00
July	25.00	21.00	21.50	26.60	19.00	21.38	41.00	100.00	47.50	38.50	62.50	32.25	35.00	42.50	38.00	35.00
August	24.62	21.00	22.12	26.00	20.25	23.13	44.20	86.00	47.50	38.50	61.00	29.60	36.10	42.50	37.75	35.00
September	24.40	20.75	23.62	24.87	21.00	24.10	45.00	66.25	47.50	38.50	58.74	29.00	39.50	41.88	36.40	35.00
October	23.75	20.00	26.00	23.30	20.00	24.63	46.25	49.38	47.50	38.50	55.00	29.00	40.00	40.00	35.75	34.25
November	23.30	19.50	27.00	21.00	19.25	26.50	52.00	47.50	47.50	41.38	49.70	29.00	37.75	40.00	35.50	34.75
December	23.00	19.25	27.00	20.00	19.00	30.60	57.50	47.50	45.50	46.00	43.50	29.00	36.50	40.00	36.00	35.00
Average	*25.40*	*21.43*	*22.39*	*25.79*	*20.08*	*22.44*	*43.95*	*70.78*	*47.33*	*40.51*	*56.22*	*34.46*	*33.95*	*41.70*	*37.99*	*35.23*

Open-Hearth Steel Billets at Pittsburgh, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$28.00	$23.00	$20.00	$28.90	$20.25	$19.25	$33.00	$63.00	$47.50	$43.50	$48.00	$43.50	$28.00	$37.50	$40.00	$38.00
February	28.75	23.00	20.00	29.00	21.00	19.50	34.75	65.00	47.50	43.50	55.25	41.00	28.00	39.63	40.00	38.00
March	29.00	23.00	19.39	29.00	21.00	19.70	42.60	66.25	47.50	42.25	60.00	38.50	28.00	44.39	40.00	36.70
April	28.63	23.00	20.00	29.00	20.80	20.00	45.00	73.75	47.50	38.50	60.00	37.50	29.50	45.00	40.00	35.50
May	28.00	22.60	20.25	27.63	20.00	20.00	43.40	86.00	47.50	38.50	60.00	37.00	34.00	45.00	38.50	35.25
June	28.00	21.00	20.75	26.50	19.40	20.50	41.50	98.75	47.50	38.50	61.00	37.00	35.00	42.63	38.00	35.00
July	26.39	21.00	21.63	26.60	19.00	21.88	42.75	100.00	47.50	38.50	65.00	32.25	35.00	42.50	38.00	35.00
August	25.75	21.00	22.63	25.39	20.25	23.50	45.00	82.50	47.50	38.50	61.00	29.60	35.50	42.50	37.75	35.00
September	24.88	20.50	24.13	24.13	21.00	24.60	45.00	66.25	47.50	38.50	58.75	29.00	39.50	41.88	36.40	35.00
October	24.39	19.00	26.70	23.30	20.00	25.25	46.25	50.50	47.50	38.50	55.00	29.00	40.00	40.00	35.75	34.25
November	23.30	19.00	27.50	21.00	19.25	27.25	52.00	47.50	47.50	41.39	49.70	29.00	37.75	40.00	35.50	34.75
December	23.00	19.25	27.75	20.00	19.00	31.80	57.50	47.50	45.50	46.40	43.50	29.00	36.50	40.00	36.00	35.00
Average	*26.51*	*21.28*	*22.56*	*25.87*	*20.08*	*22.77*	*44.06*	*70.58*	*47.33*	*40.54*	*56.43*	*34.36*	*33.90*	*41.75*	*37.99*	*35.62*

Wire Rods at Pittsburgh

No. 5 Bessemer wire rods, per gross ton. The quotations for November and December, 1917, and all of 1918, are Government prices and apply also to open-hearth rods

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$33.00	$28.00	$24.37	$30.00	$25.50	$25.00	$43.00	75.00	$57.00	$57.00	$60.00	$57.00	$36.00	$47.00	$51.00	$48.00
February	33.00	28.75	25.00	30.00	26.38	25.00	48.00	77.50	57.00	57.00	63.75	54.50	35.75	49.38	51.00	48.00
March	33.00	29.00	25.00	30.00	26.50	25.00	54.80	81.00	57.00	55.75	70.00	52.00	36.00	50.00	51.00	48.00
April	32.50	29.00	25.00	30.00	26.00	25.00	60.00	85.00	57.00	52.00	70.00	49.00	38.00	50.25	51.00	47.00
May	32.00	29.00	25.00	30.00	25.50	25.00	60.00	86.00	57.00	52.00	72.50	48.00	38.00	51.00	48.75	46.00
June	30.80	28.25	25.00	29.50	24.50	25.00	53.75	92.50	57.00	52.00	75.00	48.00	38.50	51.00	48.00	45.60
July	29.25	27.00	25.00	28.30	24.50	25.63	53.75	96.25	57.00	52.00	75.00	43.00	40.00	51.00	48.00	45.00
August	28.25	27.00	25.80	28.00	25.00	27.00	55.00	94.00	57.00	52.00	75.00	41.80	42.40	51.00	46.50	45.00
September	28.00	27.00	27.00	27.37	26.20	29.40	55.00	88.75	57.00	52.00	75.00	39.50	46.25	51.00	46.00	45.00
October	28.50	26.00	28.50	26.60	25.88	31.75	55.00	77.25	57.00	52.00	75.00	40.50	45.00	51.00	45.50	45.00
November	28.12	25.30	29.75	25.87	25.25	36.25	63.00	57.00	57.00	54.50	66.40	40.00	45.00	51.00	45.00	45.00
December	28.00	24.50	30.00	25.17	25.00	39.50	68.75	57.00	57.00	59.50	57.00	38.00	45.00	51.00	48.00	45.00
Average	*30.37*	*27.40*	*26.29*	*28.40*	*25.52*	*28.29*	*55.84*	*79.77*	*57.00*	*53.98*	*69.55*	*45.94*	*40.49*	*50.39*	*48.31*	*46.05*

Plain Wire, Base, at Pittsburgh, Cents per Pound

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	1.65	1.51	1.37	1.55	1.35	1.34	1.98	2.95	3.25	3.25	3.25	3.25	2.25	2.45	2.75	2.60
February	1.65	1.55	1.40	1.55	1.40	1.39	2.10	2.95	3.25	3.25	3.50	3.13	2.20	2.63	2.75	2.60
March	1.65	1.57	1.40	1.56	1.40	1.40	2.25	3.11	3.25	3.19	3.50	3.00	2.25	2.65	2.75	2.60
April	1.65	1.60	1.40	1.60	1.40	1.37	2.25	3.23	3.25	3.00	3.50	3.00	2.25	2.68	2.75	2.50
May	1.64	1.60	1.40	1.60	1.36	1.35	2.45	3.45	3.25	3.00	3.50	3.00	2.25	2.75	2.68	2.50
June	1.60	1.55	1.40	1.60	1.30	1.35	2.45	3.70	3.25	3.00	3.50	2.75	2.25	2.75	2.65	2.49
July	1.55	1.50	1.42	1.58	1.32	1.39	2.45	3.95	3.25	3.00	3.50	2.56	2.25	2.75	2.63	2.50
August	1.50	1.50	1.46	1.48	1.36	1.43	2.53	3.95	3.25	3.00	3.69	2.50	2.29	2.75	2.56	2.50
September	1.50	1.46	1.50	1.47	1.40	1.54	2.55	3.95	3.25	3.00	3.75	2.58	2.39	2.75	2.53	2.50
October	1.50	1.44	1.50	1.41	1.40	1.65	2.60	3.25	3.25	3.17	3.75	2.60	2.45	2.75	2.50	2.50
November	1.50	1.37	1.50	1.39	1.39	1.72	2.80	3.25	3.25	3.29	3.65	2.56	2.45	2.75	2.50	2.50
December	1.50	1.34	1.53	1.35	1.31	1.89	2.95	3.25	3.25	3.21	3.25	2.44	2.45	2.75	2.60	2.50
Average	*1.57*	*1.50*	*1.44*	*1.51*	*1.37*	*1.48*	*2.47*	*3.43*	*3.25*	*3.11*	*3.53*	*2.78*	*2.31*	*2.70*	*2.64*	*2.52*

Wire Nails at Pittsburgh, Dollars per Keg of 100 Lb.

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$1.85	$2.00	$2.05	$1.95	$1.85	$1.71	$1.57	$1.75	$1.54	$1.54	$2.13	$3.00	$3.50	$3.50	$4.50	$3.25	$2.50	$2.70	$3.00	$2.85
February	1.85	2.00	2.05	1.95	1.85	1.75	1.60	1.75	1.60	1.57	2.25	3.00	3.50	3.50	4.50	3.21	2.40	2.78	3.00	2.85
March	1.85	2.00	2.05	1.95	1.85	1.79	1.60	1.76	1.60	1.60	2.40	3.20	3.50	3.44	4.00	3.02	2.40	2.83	3.00	2.85
April	1.85	2.00	2.05	1.87	1.85	1.80	1.60	1.80	1.60	1.56	2.40	3.28	3.50	3.25	4.00	3.13	2.40	2.93	3.00	2.80
May	1.85	2.00	2.05	1.65	1.82	1.80	1.60	1.80	1.56	1.55	2.50	3.50	3.50	3.25	4.00	3.05	2.40	3.00	2.93	2.75
June	1.85	2.00	1.97	1.70	1.80	1.75	1.60	1.80	1.50	1.55	2.50	3.75	3.50	3.25	4.00	3.00	2.40	3.00	2.90	2.68
July	1.84	2.00	1.95	1.72	1.75	1.70	1.62	1.70	1.52	1.60	2.50	4.00	3.50	3.25	4.00	2.81	2.40	3.00	2.88	2.65
August	1.82	2.00	1.95	1.80	1.70	1.69	1.66	1.65	1.56	1.61	2.58	4.00	3.50	3.25	4.25	2.75	2.48	3.00	2.81	2.65
September	1.86	2.05	1.95	1.80	1.70	1.65	1.70	1.65	1.60	1.69	2.60	4.00	3.50	3.25	4.25	2.86	2.63	3.00	2.78	2.65
October	1.85	2.05	1.95	1.80	1.70	1.64	1.70	1.63	1.60	1.80	2.63	...	3.50	3.31	4.25	2.90	2.70	3.00	2.75	2.63
November	1.88	2.05	1.95	1.80	1.70	1.55	1.70	1.59	1.50	1.87	2.85	3.50	3.50	3.50	4.05	2.84	2.70	3.00	2.75	2.65
December	2.00	2.05	1.95	1.85	1.70	1.53	1.72	1.55	1.51	2.04	3.00	3.50	3.50	4.12	3.25	2.69	2.70	3.00	2.85	2.65
Average	*1.86*	*2.02*	*1.99*	*1.82*	*1.77*	*1.70*	*1.64*	*1.70*	*1.56*	*1.67*	*2.53*	*3.52*	*3.50*	*3.41*	*4.09*	*2.96*	*2.51*	*2.94*	*2.89*	*2.72*

Steel Rails at Mill, Dollars per Gross Ton

Bessemer rails to end of 1913; open-hearth rails from beginning of 1914

The extra $2 per gross ton, which has for many years been charged for open-hearth rails, was annulled with the rail price announced Oct. 22, 1921

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$28.00	$28.00	$28.00	$28.00	$30.00	$30.00	$30.00	$40.00	$57.00	$57.00	$47.00	$47.00	$40.00	$43.00	$43.00	$43.00
February	28.00	28.00	28.00	28.00	30.00	30.00	30.00	40.00	57.00	57.00	47.00	47.00	40.00	43.00	43.00	43.00
March	28.00	28.00	28.00	28.00	30.00	30.00	30.00	40.00	57.00	54.50	49.50	47.00	40.00	43.00	43.00	43.00
April	28.00	28.00	28.00	28.00	30.00	30.00	30.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
May	28.00	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
June	28.00	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
July	28.00	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
August	28.00	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
September	28.00	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00
October	28.00	28.00	28.00	28.00	30.00	30.00	35.00	....	57.00	47.00	57.00	45.25	43.00	43.00	43.00	43.00
November	28.00	28.00	28.00	28.00	30.00	30.00	38.00	....	57.00	47.00	57.00	40.00	43.00	43.00	43.00	43.00
December	28.00	28.00	28.00	28.00	30.00	30.00	40.00	....	57.00	47.00	53.00	40.00	43.00	43.00	43.00	43.00
Average	*28.00*	*28.00*	*28.00*	*28.00*	*30.00*	*30.00*	*34.00*	*40.00*	*57.00*	*49.29*	*54.38*	*45.69*	*40.75*	*43.00*	*43.00*	*43.00*

THE IRON AGE

Wire Nails, Pittsburgh, & Basic Pig, Valley Furnace

Steel Bars, Pittsburgh, & Southern No. 2 Foundry, Chicago

Steel Tank Plate, Pittsburgh, & Local No. 2 Foundry, Chicago

Bessemer Steel Billets & Heavy Melting Steel Scrap, Pittsburgh

DOLLARS PER GROSS TON

Cents per Pound

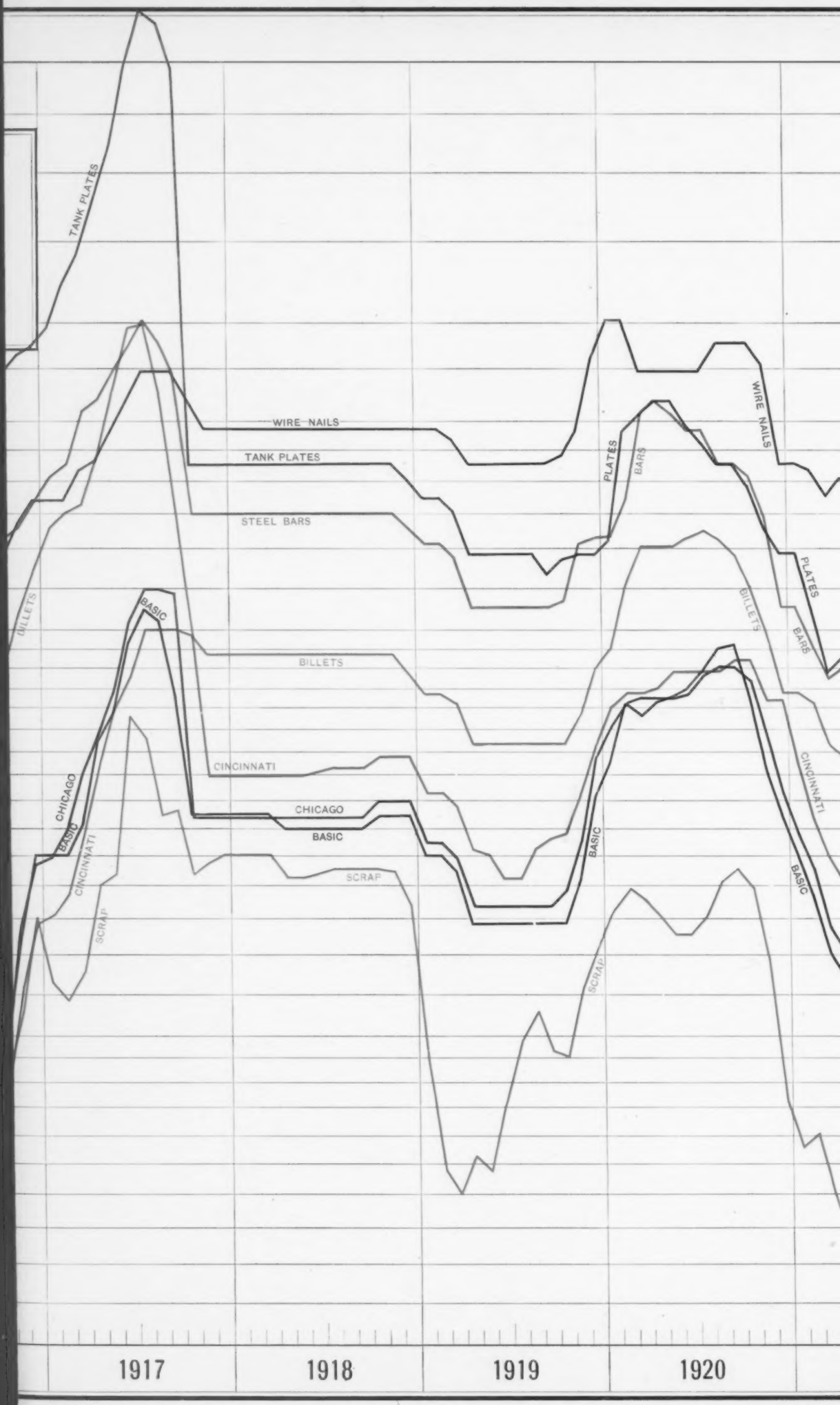
180
140
100
80
70
60
50
40
30
20
18
16
14
12
10

4
3½
3
2¾
2½
2¼
2
1¾
1½
1¼
1

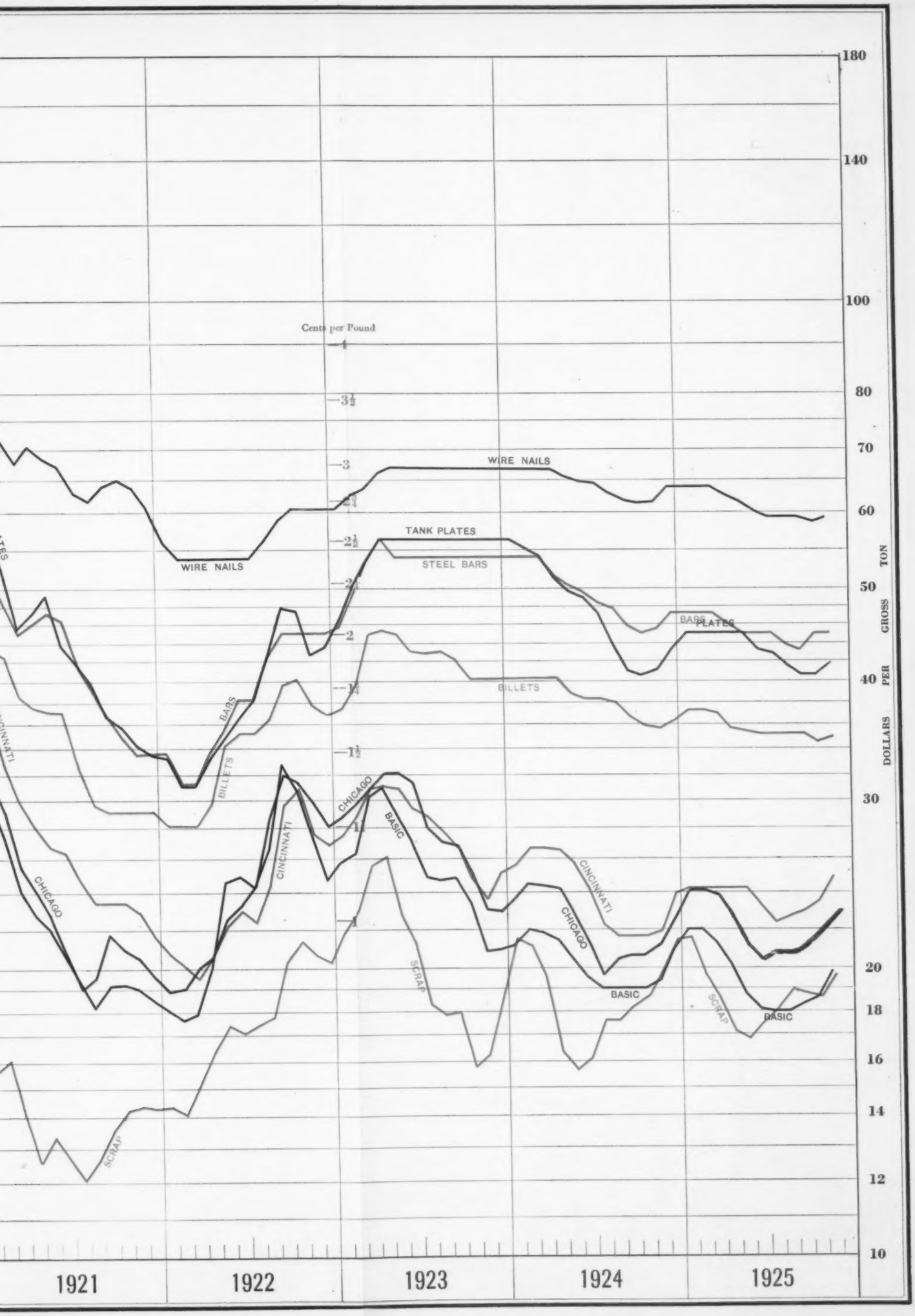
1913 1914 1915 1916 1917 1918

STEEL BARS
WIRE NAILS
TANK PLATES
BILLETS
BARS
PLATES
SCRAP
CHICAGO
BASIC
CINCINNATI

Fluctuations in Prices of Pi



Fluctuations in Prices of Pig Iron and Finished Steel—Thir



hirteen Years

Soft Steel Bars at Pittsburgh, Cents per Pound

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	1.50	1.60	1.60	1.40	1.50	1.40	1.15	1.70	1.20	1.10	2.03	3.15	2.90	2.70	2.75	2.35	1.50	2.04	2.40	2.10
February	1.50	1.60	1.60	1.35	1.50	1.40	1.12	1.70	1.20	1.10	2.31	3.25	2.90	2.70	3.00	2.15	1.39	2.20	2.40	2.10
March	1.50	1.60	1.60	1.20	1.45	1.40	1.10	1.85	1.20	1.15	2.65	3.63	2.90	2.61	3.63	2.00	1.39	2.39	2.40	2.10
April	1.50	1.60	1.60	1.15	1.45	1.40	1.16	1.84	1.15	1.20	2.88	3.75	2.90	2.35	3.75	2.05	1.50	2.50	2.29	2.05
May	1.50	1.60	1.60	1.19	1.45	1.37	1.20	1.70	1.14	1.20	3.00	4.00	2.90	2.35	3.63	2.10	1.58	2.40	2.24	2.00
June	1.50	1.60	1.45	1.20	1.45	1.25	1.20	1.60	1.11	1.21	2.75	4.25	2.90	2.35	3.50	2.05	1.70	2.40	2.20	2.00
July	1.50	1.60	1.40	1.27	1.45	1.23	1.25	1.50	1.12	1.25	2.63	4.50	2.90	2.35	3.50	1.84	1.70	2.40	2.15	2.00
August	1.50	1.60	1.40	1.32	1.40	1.20	1.30	1.40	1.19	1.30	2.56	4.30	2.90	2.35	3.25	1.74	1.88	2.40	2.13	1.95
September	1.50	1.60	1.40	1.39	1.40	1.19	1.37	1.40	1.20	1.34	2.60	4.00	2.90	2.35	3.25	1.63	2.00	2.40	2.04	1.92
October	1.50	1.60	1.40	1.51	1.40	1.12	1.45	1.39	1.15	1.44	2.75	2.90	2.90	2.39	3.13	1.55	2.00	2.40	2.00	2.00
November	1.54	1.60	1.40	1.50	1.40	1.08	1.55	1.29	1.10	1.62	2.83	2.90	2.90	2.69	2.87	1.50	2.00	2.40	2.03	2.00
December	1.60	1.60	1.40	1.50	1.40	1.12	1.66	1.21	1.07	1.84	3.00	2.90	2.80	2.75	2.35	1.50	2.00	2.40	2.10	2.00
Average	*1.51*	*1.60*	*1.49*	*1.33*	*1.44*	*1.26*	*1.29*	*1.55*	*1.15*	*1.31*	*2.67*	*3.63*	*2.89*	*2.50*	*3.22*	*1.87*	*1.72*	*2.36*	*2.20*	*2.02*

Tank Plates at Pittsburgh, Cents per Pound

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	1.60	1.70	1.70	1.60	1.55	1.40	1.15	1.75	1.20	1.10	2.25	4.45	3.25	3.00	2.72	2.65	1.48	2.06	2.50	2.00
February	1.60	1.70	1.70	1.52	1.55	1.40	1.11	1.71	1.20	1.10	2.56	4.88	3.25	3.00	3.50	2.33	1.39	2.23	2.45	2.00
March	1.60	1.70	1.70	1.30	1.55	1.40	1.12	1.70	1.18	1.10	3.10	5.25	3.25	2.91	3.63	2.04	1.39	2.39	2.39	2.00
April	1.60	1.70	1.70	1.27	1.55	1.40	1.21	1.68	1.15	1.15	3.56	5.88	3.25	2.65	3.75	2.10	1.48	2.50	2.28	2.00
May	1.60	1.70	1.70	1.29	1.51	1.39	1.25	1.60	1.12	1.15	3.75	6.60	3.25	2.65	3.75	2.20	1.56	2.50	2.20	2.00
June	1.60	1.70	1.62	1.25	1.48	1.35	1.25	1.45	1.10	1.16	3.63	8.00	3.25	2.65	3.55	1.95	1.63	2.50	2.18	1.92
July	1.60	1.70	1.60	1.33	1.41	1.35	1.30	1.45	1.10	1.22	3.44	9.00	3.25	2.65	3.38	1.85	1.70	2.50	2.09	1.90
August	1.60	1.70	1.60	1.40	1.40	1.34	1.35	1.44	1.18	1.26	3.70	8.80	3.25	2.65	3.25	1.78	1.88	2.50	1.95	1.85
September	1.60	1.70	1.60	1.46	1.40	1.29	1.47	1.40	1.20	1.34	4.00	8.00	3.25	2.53	3.25	1.64	2.13	2.50	1.82	1.80
October	1.60	1.70	1.60	1.50	1.40	1.17	1.53	1.36	1.14	1.44	4.00	3.25	3.25	2.61	3.09	1.60	2.11	2.50	1.80	1.80
November	1.62	1.70	1.60	1.54	1.40	1.13	1.59	1.26	1.08	1.65	4.15	3.25	3.25	2.65	2.81	1.54	1.99	2.50	1.83	1.86
December	1.70	1.70	1.60	1.55	1.40	1.15	1.60	1.20	1.05	2.04	4.25	3.25	3.13	2.65	2.65	1.50	1.95	2.50	1.92	1.90
Average	*1.61*	*1.70*	*1.64*	*1.42*	*1.47*	*1.31*	*1.33*	*1.50*	*1.14*	*1.31*	*3.53*	*5.88*	*3.24*	*2.72*	*3.28*	*1.93*	*1.72*	*2.43*	*2.12*	*1.91*

Structural Shapes at Pittsburgh, Cents per Pound

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	1.70	1.70	1.70	1.60	1.55	1.40	1.15	1.75	1.20	1.10	1.90	3.25	3.00	2.80	2.47	2.45	1.50	2.06	2.50	2.10
February	1.70	1.70	1.70	1.52	1.51	1.40	1.11	1.71	1.20	1.10	2.06	3.25	3.00	2.80	2.70	2.26	1.39	2.20	2.50	2.10
March	1.70	1.70	1.70	1.30	1.50	1.40	1.15	1.70	1.19	1.10	2.40	3.54	3.00	2.71	3.13	2.08	1.39	2.39	2.39	2.10
April	1.70	1.70	1.70	1.27	1.50	1.40	1.21	1.68	1.15	1.20	2.55	3.88	3.00	2.45	3.25	2.10	1.50	2.50	2.29	2.05
May	1.70	1.70	1.70	1.27	1.50	1.39	1.25	1.50	1.14	1.20	2.60	4.00	3.00	2.45	3.10	2.20	1.56	2.50	2.24	2.00
June	1.70	1.70	1.62	1.25	1.48	1.35	1.25	1.45	1.11	1.20	2.53	4.31	3.00	2.45	3.10	2.10	1.63	2.50	2.20	2.00
July	1.70	1.70	1.60	1.33	1.41	1.35	1.30	1.45	1.12	1.25	2.50	4.50	3.00	2.45	3.10	1.93	1.70	2.50	2.09	2.00
August	1.70	1.70	1.60	1.40	1.40	1.35	1.35	1.45	1.19	1.30	2.52	4.30	3.00	2.45	3.10	1.82	1.88	2.50	2.00	1.95
September	1.70	1.70	1.60	1.46	1.40	1.34	1.42	1.41	1.20	1.35	2.64	4.00	3.00	2.45	3.10	1.64	2.00	2.50	2.00	1.90
October	1.70	1.70	1.60	1.50	1.40	1.21	1.48	1.37	1.15	1.44	2.75	3.00	3.00	2.45	3.05	1.60	2.00	2.50	1.93	1.90
November	1.70	1.70	1.60	1.54	1.40	1.13	1.57	1.29	1.10	1.60	2.86	3.00	3.00	2.45	2.89	1.54	2.00	2.50	2.00	1.90
December	1.70	1.70	1.60	1.55	1.40	1.15	1.60	1.25	1.07	1.78	3.25	3.00	2.90	2.45	2.45	1.50	2.00	2.50	2.10	1.90
Average	*1.70*	*1.70*	*1.64*	*1.42*	*1.45*	*1.32*	*1.32*	*1.50*	*1.15*	*1.31*	*2.55*	*3.67*	*2.99*	*2.53*	*2.95*	*1.94*	*1.71*	*2.43*	*2.19*	*1.99*

No. 28 Black Sheets, at Pittsburgh, Cents per Pound

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	2.60	2.52	2.50	2.40	2.20	1.90	2.31	1.87	1.80	2.60	4.50	5.00	4.70	4.48	4.35	3.00	3.35	3.83	3.60
February	2.60	2.50	2.50	2.40	2.20	1.87	2.35	1.95	1.80	2.60	4.69	5.00	4.70	5.00	4.21	3.00	3.46	3.85	3.50
March	2.60	2.50	2.25	2.40	2.20	1.80	2.35	1.95	1.80	2.71	4.94	5.00	4.61	5.50	3.88	3.00	3.71	3.78	3.44
April	2.60	2.50	2.20	2.40	2.20	1.86	2.35	1.91	1.80	2.85	5.75	5.00	4.35	5.50	3.88	3.11	4.00	3.71	3.35
May	2.60	2.50	2.20	2.40	2.20	1.90	2.30	1.85	1.79	2.89	7.00	5.00	4.35	5.50	4.00	3.15	3.88	3.60	3.20
June	2.60	2.50	2.20	2.40	2.00	1.90	2.27	1.81	1.75	2.90	7.88	5.00	4.35	5.50	3.80	3.15	3.85	3.53	3.15
July	2.60	2.50	2.20	2.24	2.00	1.95	2.25	1.80	1.75	2.90	8.50	5.00	4.35	6.75	3.31	3.15	3.81	3.46	3.13
August	2.60	2.50	2.20	2.21	1.99	2.02	2.21	1.86	1.85	2.90	8.50	5.00	4.35	7.50	2.90	3.23	3.75	3.45	3.15
September	2.60	2.50	2.26	2.15	1.91	2.07	2.14	1.95	1.90	2.93	8.50	5.00	4.35	7.38	2.81	3.35	3.75	3.50	3.14
October	2.60	2.50	2.30	2.20	1.85	2.21	2.04	1.94	2.03	3.23	...	5.05	4.35	6.69	3.00	3.47	3.75	3.50	3.11
November	2.60	2.50	2.30	2.20	1.85	2.25	1.97	1.87	2.25	3.65	5.00	5.00	4.35	5.77	2.86	3.35	3.75	3.50	3.25
December	2.60	2.50	2.40	2.19	1.84	2.25	1.89	1.82	2.50	4.31	5.00	4.85	4.35	4.35	3.00	3.35	3.75	3.54	3.33
Average	*2.60*	*2.50*	*2.29*	*2.30*	*2.04*	*2.00*	*2.20*	*1.88*	*1.92*	*3.04*	*6.39*	*4.99*	*4.43*	*5.83*	*3.50*	*3.19*	*3.73*	*3.60*	*3.28*

Automobile Body Sheets, Base No. 22 Gage, f.o.b. Pittsburgh, Cents per Pound

	1920	1921	1922	1923	1924	1925
January	5.45	5.20	4.35	4.70	5.35	4.75
February	5.60	5.20	4.35	4.78	5.35	4.68
March	5.80	5.20	4.35	5.00	5.35	4.46
April	6.15	5.20	4.40	5.00	5.25	4.40
May	6.25	5.20	4.45	5.35	5.10	4.40
June	6.20	4.95	4.50	5.35	5.10	4.22
July	6.80	4.70	4.60	5.35	5.06	4.15
August	6.95	4.65	4.75	5.35	4.75	4.25
September	7.00	4.45	4.85	5.35	4.72	4.25
October	7.00	4.55	4.85	5.35	4.60	4.29
November	6.60	4.35	4.85	5.35	4.60	4.40
December	5.25	4.35	4.70	5.35	4.75	4.50
Average	*6.25*	*4.83*	*4.58*	*5.19*	*5.00*	*4.39*

Blue Annealed Sheets, Base Nos. 9 and 10 Gage, Cents per Pound, at Pittsburgh

	1920	1921	1922	1923	1924	1925
January	3.65	3.55	2.25	2.52	3.00	2.70
February	4.25	3.29	2.25	2.64	3.00	2.70
March	4.50	3.04	2.25	2.95	2.93	2.69
April	4.50	3.05	2.36	3.25	2.86	2.53
May	4.50	3.10	2.40	3.20	2.80	2.40
June	4.50	2.88	2.40	3.00	2.76	2.31
July	5.38	2.55	2.40	3.00	2.68	2.30
August	6.00	2.31	2.44	3.00	2.63	2.30
September	5.56	2.23	2.50	3.00	2.69	2.25
October	4.98	2.25	2.60	3.00	2.70	2.26
November	4.54	2.25	2.55	3.00	2.70	2.40
December	3.55	2.25	2.50	3.00	2.70	2.50
Average	*4.66*	*2.73*	*2.41*	*2.96*	*2.79*	*2.45*

Hot-Rolled and Cold-Rolled Strip Steel

Quoted in cents per pound, at Pittsburgh

	COLD-ROLLED STRIP STEEL								HOT-ROLLED STRIP STEEL							
	1918	1919	1920	1921	1922	1923	1924	1925	1918	1919	1920	1921	1922	1923	1924	1925
January	6.50	6.25	6.00	6.25	3.50	4.50	5.00	4.00	4.50	3.30	3.45	3.30	2.00	2.75	3.00	2.25
February	6.50	6.25	7.00	6.06	3.50	4.69	4.75	4.00	4.50	3.30	4.63	3.11	1.84	2.86	3.00	2.35
March	6.50	6.10	7.00	5.83	3.50	5.00	4.75	4.00	4.50	3.30	5.00	2.93	1.81	3.18	2.93	2.40
April	6.50	5.65	7.75	5.54	3.61	5.25	4.75	4.00	4.50	3.30	5.25	2.76	1.98	3.30	2.75	2.40
May	6.50	5.65	8.50	4.98	3.71	5.25	4.50	3.94	4.25	3.30	5.50	2.53	2.20	3.30	2.75	2.20
June	6.50	5.65	8.50	4.88	4.00	5.19	4.50	3.53	3.50	3.05	5.50	2.50	2.40	3.23	2.50	2.20
July	6.50	5.65	8.50	4.25	4.00	5.00	4.30	3.63	3.50	3.05	5.50	2.46	2.50	3.00	2.50	2.20
August	6.50	5.65	8.50	3.96	4.10	5.00	4.13	3.75	3.50	3.31	5.50	2.23	2.60	3.00	2.35	2.20
September	6.50	5.65	8.50	3.78	4.25	5.00	4.00	3.75	3.50	3.30	5.50	2.00	2.75	3.00	2.25	2.20
October	6.50	5.65	8.25	3.75	4.50	5.00	4.00	3.75	3.50	3.30	5.25	2.00	2.90	3.00	2.25	2.23
November	6.50	5.65	8.00	3.75	4.50	4.98	4.00	3.90	3.50	3.30	4.70	2.00	2.83	3.00	2.25	2.30
December	6.35	5.93	6.63	3.75	4.50	4.91	4.00	3.90	3.50	3.30	3.65	2.00	2.75	2.88	2.25	2.30
Average	*6.49*	*5.81*	*7.76*	*4.73*	*3.97*	*4.98*	*4.39*	*3.85*	*3.90*	*3.26*	*4.95*	*2.49*	*2.38*	*3.04*	*2.57*	*2.27*

Wrought Iron and Steel Pipe Prices

Computed from discounts as per list, with "trimmings," for carload lots; price for base size pipe, ¾ to 3-in.

Steel Pipe, per Net Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$39.90	$36.10	$32.30	$36.10	$35.20	$34.20	$41.39	$64.84	$88.92	$83.36	$80.64	$77.30	$51.87	$61.13	$70.30	$70.30
February	39.90	36.10	32.30	36.10	36.09	35.42	43.63	66.95	88.92	83.36	83.36	76.88	51.87	66.50	70.30	70.30
March	39.90	36.10	32.30	36.10	36.12	36.10	47.51	72.07	88.92	81.06	83.36	76.88	51.87	66.50	70.30	70.30
April	39.90	36.10	32.30	36.60	35.54	36.10	51.25	81.51	88.92	76.88	83.36	71.63	51.87	68.02	70.30	70.30
May	39.90	36.10	32.30	37.20	35.20	38.00	53.72	92.62	88.92	76.88	83.36	67.62	51.87	70.30	70.30	70.30
June	39.90	36.10	34.20	38.00	35.20	38.00	53.72	95.21	88.92	76.88	83.36	67.62	51.87	70.30	70.30	70.30
July	39.90	36.10	34.69	38.00	35.20	38.00	53.72	105.59	88.92	76.88	83.36	64.63	51.87	70.30	70.30	70.30
August	39.90	36.10	36.10	36.53	35.20	38.00	53.72	105.59	88.92	76.88	83.36	63.91	54.74	70.30	70.30	70.30
September	39.90	36.10	37.43	36.10	35.20	38.00	55.21	105.59	88.92	76.88	83.36	60.21	57.43	70.30	70.30	70.30
October	36.10	34.26	38.00	35.95	35.20	38.00	55.58	105.59	88.92	76.88	83.36	56.50	58.74	70.30	70.30	70.30
November	36.10	34.20	38.00	35.20	34.23	39.90	56.57	91.70	88.92	76.88	83.36	56.50	61.13	70.30	70.30	70.30
December	36.10	32.30	38.00	35.20	34.20	39.90	61.01	88.92	88.92	76.88	83.36	53.96	61.13	70.30	70.30	70.30
Average	*38.95*	*35.47*	*34.92*	*36.42*	*35.22*	*37.47*	*52.25*	*81.73*	*88.92*	*78.31*	*83.13*	*66.14*	*54.69*	*68.71*	*70.30*	*70.30*

Wrought Iron Pipe, per Net Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$49.40	$43.70	$43.70	$49.40	$51.30	$51.30	$58.64	$83.36	$122.27	$116.71	$115.60	$135.06	$100.96	$122.56	$131.10	$131.10
February	49.40	43.70	43.70	49.40	51.30	51.30	62.16	85.48	122.27	116.71	119.49	136.16	100.96	127.82	131.10	131.10
March	49.40	43.70	43.70	49.40	51.30	51.30	66.03	90.65	122.27	114.41	119.49	136.16	100.96	127.82	131.10	131.10
April	49.40	43.70	43.70	50.00	51.30	51.30	69.78	101.89	122.27	110.22	119.49	125.66	100.96	129.02	131.10	131.10
May	49.40	43.70	43.70	50.48	51.30	53.20	72.25	113.00	122.27	110.22	119.49	117.63	100.96	131.10	131.10	131.10
June	49.40	43.70	43.70	51.30	51.30	53.20	72.25	114.85	122.27	110.22	119.49	117.63	100.96	131.10	131.10	131.10
July	49.40	43.70	45.60	51.30	51.30	53.20	72.25	122.27	122.27	110.22	119.49	111.65	100.96	131.10	131.10	131.10
August	49.40	43.70	45.60	51.30	51.30	53.20	72.25	122.27	122.27	110.22	119.49	110.22	105.74	131.10	131.10	131.10
September	49.40	43.70	46.93	51.30	51.30	53.20	73.73	122.27	122.27	110.22	119.49	105.59	116.33	131.10	131.10	131.10
October	43.70	43.70	47.50	51.30	51.30	53.20	74.10	122.27	122.27	110.22	119.49	100.96	120.41	131.10	131.10	131.10
November	43.70	41.70	47.50	51.30	51.30	55.10	75.07	122.27	122.27	110.22	119.49	100.96	120.41	131.10	131.10	131.10
December	43.70	43.70	47.50	51.30	51.30	55.10	79.50	122.27	122.27	110.22	119.49	100.96	120.41	131.10	131.10	131.10
Average	*47.98*	*43.70*	*45.24*	*50.65*	*51.30*	*52.88*	*70.67*	*110.24*	*122.27*	*111.65*	*119.16*	*116.55*	*107.50*	*129.67*	*131.10*	*131.10*

Cast Iron Pipe Prices, 1910 to 1925

At New York, 6-Inch, per Net Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$25.50	$22.00	$22.00	$25.00	$22.00	$20.00	$29.00	$41.50	$55.35	$65.70	$66.30	$63.30	$47.30	$54.90	$61.60	$54.60
February	25.50	21.50	22.00	24.75	22.00	20.00	29.33	41.50	55.35	62.70	70.30	63.30	47.30	56.50	61.60	54.60
March	25.50	21.00	22.00	23.87	22.00	20.00	29.75	43.10	55.35	62.70	71.30	63.30	47.68	57.75	61.60	53.00
April	25.50	21.00	21.25	23.50	22.00	21.60	30.50	50.88	55.35	57.70	73.90	63.30	48.80	58.50	61.60	52.60
May	25.50	21.00	21.00	23.00	20.88	22.00	30.50	55.50	56.60	54.45	76.30	62.05	49.60	58.50	61.60	50.85
June	25.25	21.00	21.00	23.00	20.50	22.25	30.50	60.75	61.44	52.03	76.30	54.30	50.80	61.35	61.60	50.60
July	24.00	21.00	22.10	23.00	20.50	22.50	30.50	65.50	61.75	50.46	76.30	52.30	53.50	62.30	60.60	50.60
August	23.50	21.00	22.00	23.00	20.50	23.25	30.50	65.50	61.75	52.33	76.53	46.05	54.10	62.62	59.60	50.60
September	23.50	21.00	23.12	23.00	20.40	24.37	30.83	65.50	61.75	54.30	77.22	46.30	54.50	63.60	56.60	50.60
October	23.00	21.00	24.50	23.00	20.00	25.25	31.50	61.00	67.70	55.30	77.22	47.30	54.50	63.60	56.35	50.60
November	22.12	*21.40*	*24.12*	*23.00*	*20.00*	*26.50*	*35.50*	*56.50*	*67.70*	*58.30*	77.22	47.30	*54.50*	*63.60**	*55.60*	*50.60*
December	22.00	22.00	24.62	22.33	20.00	27.60	41.00	56.50	67.70	61.30	68.87	47.30	54.75	*63.60**	*55.20*	*50.60*
Average	*24.24*	*21.24*	*22.48*	*23.37*	*20.90*	*22.94*	*31.62*	*55.31*	*60.65*	*57.27*	*73.98*	*54.68*	*51.44*	*60.57*	*59.46*	*51.65*

*Concession of $2 to $3 per ton from this price to consumers willing to accept winter delivery.

Cast Iron Pipe, Delivered Chicago, 6 In. and Larger, per Net Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$24.00	$24.67	$29.00	$25.00	$23.50	$29.00	$41.50	$54.30	$64.30	$67.55	$64.10	$42.50	$51.80	$56.20	$48.70
February	24.25	25.00	29.00	25.00	23.50	29.50	41.75	54.30	61.80	71.30	64.10	41.60	53.20	56.20	49.95
March	24.50	25.00	27.83	24.20	23.50	29.50	43.00	54.30	60.55	72.80	64.10	42.10	54.20	56.20	47.60
April	24.50	25.00	28.10	24.00	23.50	30.50	53.00	54.30	56.80	74.80	64.10	42.85	57.20	56.20	46.70
May	24.50	25.00	26.50	24.00	23.50	30.50	55.50	55.81	54.30	76.80	60.10	44.60	60.20	55.20	47.07
June	24.50	25.00	26.50	24.00	23.70	30.50	60.75	60.83	51.80	76.80	52.85	46.10	60.20	54.70	47.70
July	24.50	25.60	26.20	24.00	24.00	30.50	65.50	62.05	52.60	76.80	48.85	45.57	60.20	54.80	48.20
August	24.50	27.13	26.00	24.00	24.00	30.50	65.50	61.80	55.30	78.18	43.20	46.40	60.20	53.45	49.20
September	24.50	28.00	26.00	24.00	24.70	31.00	65.50	61.80	55.80	82.10	42.60	47.45	59.95	51.80	49.20
October	24.50	28.00	26.00	24.00	25.75	31.50	53.50	66.80	59.00	83.10	42.60	51.20	57.40	49.70	49.20
November	24.50	28.75	25.63	24.00	27.00	36.25	54.25	66.80	59.80	83.10	42.90	51.20	55.45	48.20	50.20
December	24.50	29.00	25.00	23.50	27.77	41.00	55.21	66.80	64.40	68.60	43.10	51.20	55.20	47.60	50.20
Average	*24.44*	*26.35*	*26.81*	*24.14*	*24.54*	*31.69*	*54.58*	*59.99*	*58.04*	*76.00*	*52.72*	*46.06*	*57.10*	*53.35*	*48.66*

Southern Ohio No. 2 Foundry Iron, per Gross Ton, at Cincinnati

	1920	1921	1922	1923	1924	1925
January	$40.93	$33.78	$22.15	$29.78	$25.18	$24.27
February	44.18	32.03	22.03	30.28	26.03	24.27
March	45.18	29.93	21.38	32.68	25.78	23.87
April	46.20	28.28	22.78	33.14	25.39	23.15
May	46.80	27.03	25.28	32.23	24.39	21.77
June	46.80	25.73	25.53	30.53	22.53	21.27
July	46.80	23.93	26.40	28.71	21.53	21.27
August	47.73	22.53	30.18	28.08	21.78	21.77
September	48.92	23.13	34.28	27.03	22.15	21.77
October	48.28	23.53	34.53	26.93	22.28	21.90
November	46.28	22.73	31.83	24.78	22.90	23.27
December	38.13	22.27	29.28	24.78	23.88	23.27
Average	*45.52*	*26.49*	*27.14*	*28.75*	*23.66*	*22.65*

Six Years of Finished Iron and Steel, Chicago and Pittsburgh

Sheets, Bars and Beams at Chicago—Rivets, Cotton Ties and Cold-Finished Bars at Pittsburgh

Black Sheets, No. 28 Gage, at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925
January	4.75	4.73	3.38	3.69	4.17	3.75
February	5.27	4.57	3.38	3.69	4.19	3.75
March	5.77	4.40	3.38	3.90	4.14	3.75
April	5.77	4.21	3.46	4.25	4.03	3.65
May	5.77	4.38	3.53	4.19	3.99	3.48
June	5.77	4.15	3.53	4.19	3.99	3.32
July	7.02	3.76	3.49	4.19	3.84	3.35
August	7.77	3.33	3.57	4.19	3.84	3.35
September	7.76	3.19	3.69	4.12	3.93	3.35
October	7.07	3.34	3.69	4.09	3.65	3.31
November	6.15	3.38	3.69	4.09	3.68	3.43
December	4.73	3.38	3.69	4.09	3.75	3.50
Average	*6.10*	*3.86*	*3.54*	*4.06*	*3.93*	*3.50*

Galvanized Sheets, No. 28 Gage, at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925
January	5.60	6.08	4.38	4.69	5.34	4.90
February	6.77	5.88	4.38	4.69	5.34	4.90
March	7.27	5.44	4.38	5.02	5.29	4.88
April	7.27	5.18	4.46	5.28	5.21	4.75
May	7.27	5.38	4.53	5.34	5.12	4.55
June	7.27	5.13	4.53	5.34	5.14	4.39
July	8.52	4.76	4.49	5.34	5.00	4.38
August	9.27	4.33	4.67	5.34	4.94	4.39
September	9.26	4.19	4.69	5.34	5.00	4.40
October	8.56	4.34	4.69	5.34	4.75	4.41
November	7.42	4.38	4.69	5.22	4.79	4.68
December	6.08	4.38	4.69	5.24	4.90	4.75
Average	*7.55*	*4.91*	*4.54*	*5.18*	*5.07*	*4.62*

Blue Annealed Sheets, Nos. 9 and 10 Gage, at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925
January	4.07	3.93	2.63	2.84	3.34	2.85
February	3.95	3.72	2.63	2.84	3.34	2.85
March	3.82	3.43	2.63	3.03	3.29	2.83
April	3.82	3.26	2.71	3.32	3.21	2.75
May	3.82	3.48	2.78	3.34	3.14	2.55
June	3.82	3.26	2.78	3.34	3.14	2.44
July	3.82	2.93	2.74	3.34	3.07	2.48
August	3.82	2.63	2.78	3.34	3.04	2.45
September	3.93	2.63	2.84	3.34	3.10	2.45
October	3.93	2.63	2.84	3.34	2.85	2.45
November	3.93	2.63	2.84	3.34	2.85	2.58
December	3.93	2.63	2.84	3.34	2.85	2.65
Average	*3.89*	*3.06*	*2.75*	*3.23*	*3.10*	*2.61*

Rail Steel Bars at Chicago Mill, Cents per Pound

	1920	1921	1922	1923	1924	1925
January	3.25	2.60	1.56	2.00	2.30	2.03
February	3.25	2.41	1.50	2.10	2.30	2.10
March	3.50	2.23	1.50	2.28	2.30	2.10
April	3.75	2.25	1.55	2.33	2.30	2.10
May	3.75	2.05	1.60	2.30	2.20	2.10
June	3.75	1.95	1.63	2.28	2.15	2.02
July	3.75	1.90	1.70	2.30	2.10	2.00
August	3.95	1.76	1.89	2.30	2.05	2.00
September	4.00	1.75	2.00	2.30	2.00	2.00
October	3.81	1.68	2.00	2.30	2.00	2.00
November	3.15	1.65	2.00	2.30	2.00	2.00
December	2.67	1.75	2.00	2.30	2.00	2.00
Average	*3.56*	*1.99*	*1.75*	*2.25*	*2.14*	*2.04*

Cotton Tie Prices for Twenty-One Years

(Per Bundle of 45-Lb., f.o.b. Pittsburgh)

1905 ..... $0.85	1912 ..... $0.70	1919 ..... $1.70
1906 ..... 0.85	1913 ..... 0.80	1920 ..... 2.00
1907 ..... 0.95	1914 ..... 0.65	1921 ..... 1.30
1908 ..... 0.85	1915 ..... 0.85	1922 ..... 1.10
1909 ..... 0.70	1916 ..... 1.35	1923 ..... 1.60
1910 ..... 0.75	1917 ..... 2.10	1924 ..... *1.40
1911 ..... 0.75	1918 ..... 2.10	1925 ..... †1.25

*F.o.b. Atlantic and Gulf ports.
†F.o.b. Gulf ports; $1.28, f.o.b. Atlantic ports.

Common Bar Iron at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925
January	3.24	2.68	1.60	2.35	2.40	2.00
February	3.63	2.65	1.58	2.46	2.40	2.03
March	3.68	2.60	1.58	2.53	2.40	2.10
April	3.75	2.38	1.63	2.60	2.35	2.10
May	3.75	2.35	1.67	2.60	2.28	2.08
June	3.88	2.23	1.74	2.55	2.23	2.01
July	3.88	1.96	1.85	2.50	2.20	1.96
August	3.88	1.75	2.11	2.40	2.18	1.90
September	3.88	1.75	2.25	2.39	2.14	1.90
October	3.88	1.75	2.50	2.38	2.10	1.90
November	3.75	1.73	2.50	2.40	2.08	1.94
December	3.39	1.63	2.35	2.40	2.01	2.00
Average	*3.72*	*2.12*	*1.95*	*2.47*	*2.23*	*1.99*

Soft Steel Bars at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925
January	2.96	2.73	1.60	2.08	2.50	2.13
February	3.45	2.57	1.53	2.21	2.50	2.20
March	3.57	2.40	1.55	2.45	2.50	2.20
April	3.70	2.43	1.60	2.84	2.38	2.15
May	3.45	2.48	1.66	2.74	2.30	2.10
June	3.45	2.37	1.75	2.60	2.25	2.10
July	3.45	2.21	1.75	2.60	2.19	2.10
August	3.47	1.96	2.05	2.60	2.13	2.10
September	3.50	1.78	2.10	2.50	2.02	2.10
October	3.31	1.75	2.10	2.50	2.00	2.10
November	3.04	1.67	2.10	2.50	2.05	2.10
December	2.73	1.60	2.10	2.50	2.10	2.10
Average	*3.34*	*2.16*	*1.83*	*2.51*	*2.24*	*2.12*

Structural Steel Beams at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925
January	2.72	2.83	1.60	2.18	2.60	2.23
February	3.18	2.67	1.53	2.31	2.60	2.30
March	3.50	2.50	1.55	2.52	2.60	2.30
April	3.50	2.53	1.60	2.84	2.50	2.25
May	3.50	2.58	1.66	2.84	2.45	2.20
June	3.45	2.48	1.75	2.70	2.39	2.18
July	3.25	2.28	1.75	2.70	2.27	2.10
August	3.14	1.99	2.05	2.70	2.20	2.10
September	3.23	1.79	2.20	2.60	2.06	2.10
October	3.20	1.75	2.20	2.60	2.00	2.10
November	3.07	1.69	2.20	2.60	2.15	2.10
December	2.83	1.63	2.20	2.60	2.20	2.10
Average	*3.22*	*2.23*	*1.86*	*2.59*	*2.33*	*2.17*

Cold-Finished Steel Bars, Base per 100 Pounds, f.o.b. Pittsburgh

	1920	1921	1922	1923	1924	1925
January	3.60	3.60	1.94	2.53	3.00	2.80
February	3.85	3.60	1.90	2.73	2.95	2.80
March	5.00	3.20	1.80	2.85	2.98	2.72
April	5.00	3.05	1.85	3.00	3.00	2.70
May	5.00	3.10	1.94	3.25	2.90	2.70
June	5.00	3.00	2.03	3.25	2.90	2.60
July	6.00	2.69	2.10	3.25	2.84	2.60
August	6.00	2.40	2.23	3.25	2.80	2.50
September	4.69	2.36	2.50	3.25	2.74	2.46
October	4.06	2.18	2.50	3.10	2.70	2.40
November	3.92	2.09	2.50	2.95	2.70	2.48
December	3.60	2.00	2.50	3.00	2.78	2.50
Average	*4.64*	*2.77*	*2.15*	*3.03*	*2.86*	*2.61*

Large Structural Rivets, Base per 100 Pounds, f.o.b. Pittsburgh

	1920	1921	1922	1923	1924	1925
January	$4.11	$4.13	$2.25	$3.00	$2.90	$2.60
February	4.33	3.90	2.18	3.00	2.75	2.60
March	4.50	3.78	2.00	3.25	2.75	2.60
April	4.50	3.55	2.10	3.25	2.65	2.58
May	4.50	3.32	2.24	3.25	2.65	2.45
June	4.50	3.03	2.36	3.25	2.61	2.40
July	4.50	2.71	2.46	3.13	2.60	2.40
August	4.50	2.50	2.65	3.00	2.55	2.40
September	4.50	2.24	3.00	2.95	2.60	2.40
October	4.75	2.36	3.12	2.75	2.58	2.40
November	4.70	2.25	3.10	2.68	2.60	2.60
December	4.44	2.25	3.00	2.90	2.60	2.60
Average	*4.49*	*3.00*	*2.55*	*3.02*	*2.65*	*2.50*

Monthly Averages of Ferroalloy Quotations

Ferromanganese (80 Per Cent) Prices in Dollars per Gross Ton, at Seaboard

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
Jan.	$38.04	$41.00	$68.00	$44.40	$68.00	$150.00	$175.00	$250.00	$255.00	$146.00	$112.50	$58.35	$105.00	$108.70	$112.50
Feb.	37.69	41.00	65.00	39.25	69.75	207.50	231.25	250.00	215.00	172.50	100.00	60.42	107.50	107.50	115.00
March	37.10	41.00	65.00	38.50	100.00	349.60	290.00	250.00	175.00	216.25	96.00	62.50	113.75	107.50	115.00
April	36.75	43.00	61.00	38.00	100.00	406.25	362.50	290.00	150.00	240.00	90.00	64.37	120.00	107.50	115.00
May	36.50	47.50	61.00	38.00	100.00	387.50	420.50	290.00	138.40	250.00	85.00	66.87	128.00	107.50	115.00
June	36.50	49.25	61.00	38.00	100.00	270.00	443.75	290.00	121.00	225.00	80.00	67.50	128.75	107.50	115.00
July	36.50	48.88	59.00	37.20	109.00	175.00	406.25	290.00	111.00	225.00	70.60	67.50	*119.50	106.50	115.00
Aug.	36.70	52.40	56.38	108.33	127.25	172.00	400.00	290.00	101.25	198.75	70.00	67.50	117.50	95.75	115.00
Sept.	37.75	59.63	56.00	90.00	117.00	169.75	387.50	285.00	98.75	170.00	65.80	75.63	*111.25	90.00	115.00
Oct.	38.50	67.80	50.10	70.40	105.00	162.25	310.00	285.00	105.00	170.00	63.00	100.00	*110.00	90.00	115.00
Nov.	38.40	73.75	50.00	68.00	105.00	160.80	256.00	285.00	112.50	170.00	61.50	100.00	*108.75	98.75	115.00
Dec.	39.75	75.00	47.00	72.20	106.00	169.75	243.75	275.00	122.50	135.00	60.00	100.00	*108.25	107.00	115.00
Average	*37.51*	*53.35*	*58.29*	*56.86*	*105.83*	*231.70*	*327.21*	*277.50*	*142.12*	*193.21*	*79.53*	*74.22*	*114.85*	*102.85*	*114.79*

*Price at furnace, where lower than price at seaboard.

Spiegeleisen (19 to 21 Per Cent), Dollars per Gross Ton at Furnace

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$25.00	$25.00	$30.38	$60.00	$60.00	$66.00	$51.40	$45.00	$26.00	$34.40	$38.00	$33.00
February	25.00	25.00	36.25	68.75	61.25	60.75	58.75	40.00	38.00	35.50	38.00	33.00
March	25.00	25.00	57.00	75.00	71.25	47.00	60.00	35.00	29.40	40.00	38.00	33.00
April	25.00	25.00	65.00	75.00	80.75	45.00	67.60	34.00	32.25	45.00	36.80	33.00
May	25.00	25.00	65.00	81.00	84.00	37.40	75.00	32.00	35.00	52.50	36.00	33.00
June	25.00	25.00	61.00	82.50	89.00	31.25	75.00	32.00	36.00	48.50	35.00	32.80
July	25.00	25.00	52.50	85.00	89.00	35.00	75.00	27.00	36.00	44.00	34.20	32.00
August	25.00	25.00	45.00	85.00	89.00	35.00	80.00	26.00	37.80	46.75	32.50	32.00
September	25.00	26.60	45.00	82.50	83.75	35.00	82.00	26.00	38.25	43.75	31.40	31.80
October	25.00	29.25	42.75	76.25	82.00	35.00	81.88	26.00	38.00	43.75	30.75	31.25
November	25.00	29.25	45.40	66.00	80.25	37.00	75.62	26.00	37.50	41.25	30.25	32.00
December	25.00	29.25	55.00	60.00	74.38	40.00	59.10	26.00	37.50	39.00	32.00	32.00
Average	*25.00*	*26.20*	*50.02*	*74.75*	*78.72*	*42.03*	*70.11*	*31.25*	*34.31*	*42.87*	*34.41*	*32.50*

50 Per Cent Ferrosilicon (Per Gross Ton, Delivered East of Mississippi)

	1920	1921	1922	1923	1924	1925
January	$80.00	$75.00	$54.00	$82.50	$75.00	$82.50
February	85.00	93.00	55.00	83.75	75.00	82.50
March	85.00	92.40	55.00	90.00	75.00	82.50
April	85.00	86.25	55.00	92.50	75.00	82.50
May	80.00	76.40	55.00	94.50	75.00	82.50
June	80.00	69.75	55.00	90.00	75.00	82.50
July	80.00	66.00	55.00	82.50	71.00	82.50
August	75.00	60.80	55.00	82.50	71.25	82.50
September	75.00	60.00	55.00	82.50	72.00	82.50
October	75.00	58.50	67.00	81.00	71.00	82.50
November	75.00	55.80	75.00	80.63	70.00	82.50
December	75.00	56.00	82.50	76.25	75.00	82.50
Average	*79.17*	*70.83*	*59.88*	*84.89*	*73.35*	*82.50*

Connellsville Coke Prices for Eighteen Years

Average Prices of Prompt Connellsville Furnace Coke, per Net Ton at Oven

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$1.92	$1.59	$2.55	$1.40	$1.82	$3.88	$1.85	$1.50	$2.94	$9.50	$6.00	$5.65	$6.00	$5.06	$2.75	$8.05	$3.94	$3.94
February	1.86	1.59	2.12	1.45	1.78	2.52	1.85	1.50	3.38	9.62	6.00	4.44	6.60	4.50	3.04	7.13	4.08	3.63
March	1.72	1.60	2.00	1.55	2.12	2.40	1.90	1.50	3.47	9.60	6.00	4.06	6.00	4.35	3.25	7.25	4.08	3.35
April	1.57	1.60	1.77	1.59	2.39	2.15	1.86	1.50	2.41	7.38	6.00	3.65	9.60	3.50	4.48	6.31	3.75	3.04
May	1.50	1.57	1.66	1.50	2.28	2.13	1.77	1.50	2.30	7.80	6.00	3.69	12.00	3.25	6.00	5.15	3.25	3.00
June	1.55	1.52	1.65	1.42	2.02	2.11	1.75	1.56	2.49	11.25	6.00	4.00	15.00	3.00	6.75	4.75	3.19	2.77
July	1.57	1.58	1.59	1.44	2.21	2.45	1.75	1.64	2.75	12.75	6.00	4.07	17.20	2.81	10.75	4.55	3.00	2.83
August	1.50	1.66	1.57	1.46	2.21	2.50	1.70	1.50	2.80	13.60	6.00	4.31	17.75	2.75	12.80	4.56	3.00	3.06
September	1.50	2.39	1.60	1.50	2.37	2.29	1.65	1.61	2.94	11.12	6.00	4.56	16.70	3.15	11.13	4.50	3.00	3.49
October	1.53	2.76	1.59	1.50	3.41	2.98	1.60	2.03	4.88	6.00	6.00	4.52	15.12	3.28	9.60	3.85	3.00	6.13
November	1.72	2.74	1.50	1.52	3.94	1.82	1.52	2.28	6.90	6.00	6.00	5.87	8.26	3.03	7.19	3.81	3.04	5.75
December	1.82	2.67	1.44	1.60	4.00	1.75	1.50	2.64	8.38	6.00	6.00	6.12	6.20	2.75	7.00	4.00	3.68	4.32
Average	*1.65*	*1.94*	*1.75*	*1.49*	*2.55*	*2.42*	*1.73*	*1.73*	*3.80*	*9.22*	*6.00*	*4.58*	*11.32*	*3.45*	*7.06*	*5.33*	*3.42*	*3.78*

Average Prices of Prompt Connellsville Foundry Coke, per Net Ton at Oven

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$2.45	$2.00	$2.90	$1.90	$1.97	$4.40	$2.50	$2.00	$3.50	$9.75	$7.00	$6.25	$7.00	$6.38	$3.75	$8.70	$4.75	$4.88
February	2.39	1.95	2.70	2.10	2.09	3.25	2.50	2.00	3.50	11.00	7.00	5.00	7.00	5.63	4.00	8.25	4.88	4.31
March	2.25	1.95	2.60	2.05	2.56	3.00	2.45	2.00	3.75	11.60	7.00	4.94	7.00	5.45	4.25	8.38	4.88	4.15
April	2.22	1.86	2.45	2.00	2.69	3.00	2.40	2.00	3.56	9.13	7.00	4.30	10.20	4.75	5.06	7.56	4.75	4.00
May	2.03	1.85	2.20	1.81	2.58	2.85	2.40	2.00	3.25	8.90	7.00	4.31	13.00	4.50	6.30	6.15	4.69	4.00
June	2.00	1.80	2.17	1.76	2.40	2.80	2.32	2.00	3.25	11.72	7.00	4.56	15.75	4.45	7.25	5.56	4.38	3.80
July	2.00	2.00	2.15	1.82	2.40	2.70	2.22	2.05	3.25	13.25	7.00	5.00	17.80	4.06	11.00	5.35	4.10	3.75
August	1.92	1.95	2.15	1.85	2.40	2.90	2.25	2.00	3.30	13.20	7.00	5.25	18.88	3.75	13.90	5.38	4.00	3.88
September	1.90	2.55	2.12	1.85	2.54	2.90	2.10	2.07	3.31	11.75	7.00	5.80	17.70	4.15	12.50	5.50	4.00	4.25
October	2.10	2.90	2.10	1.81	3.65	2.81	2.00	2.35	3.88	6.00	7.00	6.25	16.38	4.38	11.70	4.80	4.00	6.31
November	2.20	3.25	2.05	1.85	4.25	2.60	1.92	2.88	7.10	7.00	7.00	7.00	9.50	4.19	8.38	4.81	4.06	6.81
December	2.25	3.20	1.97	1.90	4.50	2.50	1.90	2.95	8.63	7.00	7.00	7.00	7.00	3.81	7.88	4.81	4.55	5.20
Average	*2.14*	*2.27*	*2.30*	*1.89*	*2.84*	*2.98*	*2.25*	*2.19*	*4.19*	*10.03*	*7.00*	*5.47*	*12.27*	*4.63*	*8.00*	*6.27*	*4.42*	*4.61*

Heavy Melting Steel Composite Price

(Average of Pittsburgh, Chicago and Philadelphia Quotations, per Gross Ton)

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$16.90	$12.50	$11.77	$14.02	$10.29	$10.27	$16.46	$21.73	$29.93	$17.77	$25.13	$15.04	$12.45	$20.22	$19.15	$20.08
February	16.42	13.15	11.46	13.06	11.39	10.39	16.10	21.35	29.92	14.75	26.00	15.21	12.46	21.46	19.21	18.27
March	16.10	13.43	11.71	13.10	11.10	10.78	17.28	23.60	29.58	14.52	25.50	13.17	13.46	24.79	17.56	16.92
April	15.69	12.63	12.44	13.39	10.83	10.61	17.42	26.63	28.47	15.79	24.42	11.63	14.71	24.00	15.20	15.48
May	14.54	12.07	12.85	12.30	10.60	10.79	16.47	27.63	28.79	15.06	23.71	12.20	15.67	20.77	14.71	15.46
June	14.23	12.06	12.94	11.60	10.57	10.78	15.25	37.21	28.87	16.54	23.47	11.47	15.52	18.94	14.88	16.09
July	13.67	12.21	12.82	11.42	10.50	11.65	15.19	36.00	29.00	19.13	24.21	11.00	15.92	17.23	16.00	16.46
August	13.43	12.50	13.19	11.46	10.42	13.00	15.35	31.30	29.00	20.25	25.88	11.57	16.30	16.58	16.58	17.23
September	13.50	11.94	13.73	11.35	10.30	13.79	15.67	31.50	29.00	18.87	26.53	12.15	18.33	16.98	17.20	17.39
October	13.44	11.27	14.90	11.00	9.71	13.62	16.90	26.60	29.00	18.67	23.73	12.88	19.20	15.15	17.08	17.08
November	13.30	11.02	14.69	10.39	9.13	14.63	20.40	27.83	28.50	20.50	20.00	12.73	18.02	15.13	18.17	17.63
December	12.75	11.52	14.00	9.97	9.50	16.20	24.13	28.87	25.00	22.77	15.92	12.29	17.94	17.37	20.08	17.39
Average	*14.50*	*12.19*	*13.04*	*11.92*	*10.36*	*12.21*	*17.22*	*28.35*	*28.76*	*17.89*	*23.71*	*12.61*	*15.83*	*19.05*	*17.15*	*17.12*

Scrap Prices at Pittsburgh, per Gross Ton

Heavy Melting Steel

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.69	$13.50	$12.75	$14.95	$10.90	$11.63	$17.50	$22.60	$30.00	$19.00	$26.30	$15.50	$14.30	$21.80	$21.38	$21.50
February	17.25	14.13	12.12	14.19	12.62	11.63	17.06	21.75	30.00	14.75	27.75	16.00	14.00	23.25	20.88	19.50
March	16.80	14.35	12.62	14.19	12.12	12.00	18.45	23.25	30.00	14.00	27.25	14.00	15.13	25.38	19.38	18.50
April	16.50	13.06	13.06	14.19	12.00	11.81	17.81	28.00	28.50	15.20	26.00	12.63	16.38	25.88	16.20	17.00
May	15.30	12.62	13.25	13.55	12.00	11.75	16.95	28.80	28.50	14.75	25.00	13.30	17.30	22.80	15.63	16.75
June	15.10	12.95	13.44	12.62	12.00	11.75	15.88	41.00	28.62	17.12	25.00	12.69	17.00	21.13	16.00	17.30
July	14.50	13.06	13.31	12.40	12.00	12.31	16.31	39.00	29.00	19.70	26.00	12.00	17.38	18.10	17.50	18.00
August	14.31	13.20	13.55	12.37	11.50	13.81	16.05	32.83	29.00	21.00	28.13	12.70	17.75	17.75	17.50	18.88
September	14.35	12.50	14.11	12.25	11.31	14.30	16.19	33.25	29.00	19.20	29.00	13.63	20.13	17.88	18.10	18.70
October	14.25	12.06	15.85	11.85	10.85	14.38	18.25	28.80	29.00	19.00	27.75	14.13	21.40	15.70	18.50	18.50
November	14.25	12.00	15.12	11.44	10.00	15.88	21.20	29.50	28.87	22.25	23.50	14.30	20.50	16.13	19.63	19.50
December	13.75	12.31	14.75	11.08	10.75	17.45	26.00	30.00	26.87	24.25	17.20	14.25	20.13	18.75	21.40	19.10
Average	*15.34*	*12.98*	*13.66*	*12.92*	*11.50*	*13.23*	*18.14*	*29.90*	*28.95*	*18.35*	*25.74*	*13.76*	*17.62*	*20.38*	*18.51*	*18.60*

No. 1 Cast Cupola Scrap

	1918	1919	1920	1921	1922	1923	1924	1925
Jan.	$30.00	$24.20	$32.00	$25.00	$16.30	$23.30	$21.00	$19.63
Feb.	30.00	18.75	34.00	22.75	16.00	24.75	21.38	20.13
March	30.00	18.00	34.00	21.20	15.94	26.75	20.25	18.60
April	29.00	19.00	33.00	18.00	16.88	27.75	18.50	17.75
May	28.50	17.20	32.00	18.00	18.50	26.30	17.88	17.50
June	28.62	18.50	32.00	16.63	18.75	24.13	17.25	17.10
July	29.00	20.40	40.20	16.00	19.00	21.10	17.80	17.00
Aug.	29.00	23.50	41.25	16.20	19.00	21.38	18.00	17.50
Sept.	29.00	23.50	42.00	16.88	22.13	21.75	18.00	17.40
Oct.	29.00	23.80	39.75	17.50	24.00	19.50	18.00	17.39
Nov.	29.00	27.25	34.25	17.10	23.13	18.63	18.13	18.00
Dec.	27.00	28.75	27.25	16.13	22.38	20.00	19.10	17.70
Aver.	*29.01*	*21.90*	*35.14*	*18.45*	*19.33*	*22.95*	*18.77*	*17.98*

Machine Shop Turnings

	1918	1919	1920	1921	1922	1923	1924	1925
Jan.	$20.00	$11.20	$15.50	$10.00	$9.60	$16.90	$15.75	$17.50
Feb.	20.00	8.50	17.88	10.00	9.56	18.50	16.13	15.88
March	20.00	9.00	18.00	9.40	10.50	20.38	14.50	14.20
April	18.50	10.12	16.70	8.13	11.88	20.50	12.45	13.39
May	18.00	11.62	15.38	8.70	13.30	19.20	11.88	12.25
June	18.00	9.68	14.75	7.56	13.32	17.19	13.00	13.05
July	18.80	11.60	13.40	7.00	14.00	12.10	13.50	13.63
Aug.	19.00	13.50	15.25	7.85	14.00	11.44	14.13	15.00
Sept.	19.00	12.25	16.30	9.06	14.75	12.88	14.40	14.75
Oct.	19.00	12.75	15.88	9.56	16.20	11.60	14.25	14.39
Nov.	19.00	14.00	14.63	9.85	16.63	11.63	15.94	15.00
Dec.	17.50	14.25	10.50	8.88	15.63	13.75	17.20	14.30
Aver.	*18.90*	*11.54*	*15.35*	*8.83*	*13.28*	*15.51*	*14.43*	*14.44*

Compressed Sheets

	1918	1919	1920	1921	1922	1923	1924	1925
Jan.	$26.00	$16.50	$23.00	$13.00	$11.80	$20.50	$18.88	$20.00
Feb.	26.00	13.25	23.75	13.00	12.00	21.75	19.63	18.00
March	26.00	11.40	23.00	12.00	13.13	23.75	17.50	17.35
April	24.40	13.00	22.13	10.50	14.63	24.75	14.60	15.63
May	26.00	12.75	22.00	10.80	15.10	24.30	13.75	15.46
June	27.25	14.30	22.00	10.13	15.13	19.88	14.38	16.30
July	29.00	15.00	21.50	9.38	15.50	16.90	15.70	16.63
Aug.	29.00	17.88	23.90	10.00	16.10	16.13	16.00	17.39
Sept.	29.00	18.00	24.25	10.06	17.88	16.00	16.55	17.40
Oct.	29.00	18.00	22.75	12.00	19.50	14.30	16.50	17.39
Nov.	29.00	18.00	19.80	12.00	19.50	14.25	17.75	18.00
Dec.	23.80	19.80	14.75	11.69	19.38	16.50	19.40	18.00
Aver.	*27.04*	*15.66*	*21.90*	*11.22*	*15.80*	*19.08*	*16.72*	*17.27*

Cast Iron Borings

	1918	1919	1920	1921	1922	1923	1924	1925
Jan.	$20.00	$15.00	$18.70	$13.00	$10.90	$18.40	$16.94	$17.50
Feb.	20.00	10.37	20.25	12.00	11.06	19.50	16.88	15.88
March	20.00	9.75	19.50	11.45	11.94	21.13	15.38	14.10
April	18.50	10.62	18.60	9.38	13.38	21.88	13.00	13.39
May	18.50	10.60	17.38	9.70	14.10	20.20	12.75	12.50
June	18.50	11.19	16.75	8.38	14.63	17.88	14.00	13.05
July	18.90	13.20	18.00	7.63	16.00	15.20	13.80	13.63
Aug.	19.00	15.25	19.63	8.30	15.70	13.88	14.75	15.00
Sept.	19.00	15.38	20.20	9.00	17.00	15.63	14.90	14.75
Oct.	19.00	17.90	19.00	10.13	18.60	13.50	15.00	14.39
Nov.	19.00	17.50	17.38	10.40	17.85	12.75	15.13	15.00
Dec.	17.50	17.75	14.00	9.25	17.50	14.88	16.70	14.90
Aver.	*18.99*	*13.71*	*18.28*	*9.88*	*14.89*	*17.07*	*14.94*	*14.51*

Low-Phosphorus Scrap, at Pittsburgh; Billet and Bloom Crops; per Gross Ton

	1920	1921	1922	1923	1924	1925
January	$30.80	$24.00	$17.60	$25.38	$23.60	$26.50
February	31.75	23.75	17.13	27.50	25.125	24.75
March	31.00	21.60	17.38	32.00	24.00	23.30
April	30.25	18.63	18.88	32.25	19.40	22.125
May	30.00	18.10	20.00	28.60	19.50	21.625
June	30.00	16.88	20.00	25.88	20.125	22.00
July	31.25	15.88	20.13	22.00	20.90	22.00
August	33.40	16.50	21.20	23.50	21.88	22.25
September	34.25	17.25	24.25	24.38	22.60	23.00
October	33.00	17.50	25.00	21.90	23.00	23.125
November	30.00	17.30	24.00	20.50	23.25	24.00
December	25.25	17.00	24.00	21.75	25.13	24.00
Average	*30.91*	*18.70*	*20.80*	*25.46*	*22.39*	*23.22*

No. 1 Railroad Cast Scrap at Cincinnati

(Per Net Ton)

	1920	1921	1922	1923	1924	1925
January	$28.75	$16.25	$12.00	$17.20	$17.25	$17.38
February	30.00	15.50	11.63	19.50	17.75	15.88
March	31.00	13.90	12.00	21.75	16.25	15.50
April	31.00	13.50	13.25	22.00	14.00	15.13
May	31.00	13.50	14.00	20.60	13.00	15.00
June	31.00	12.75	14.00	18.00	13.38	15.90
July	31.00	11.00	14.00	16.70	14.50	16.00
August	32.00	11.00	14.40	16.25	14.50	15.63
September	31.75	12.00	16.13	16.88	15.30	15.50
October	31.50	12.50	18.00	14.50	14.88	15.00
November	23.50	12.50	17.13	13.66	15.63	15.88
December	19.25	12.00	16.63	15.00	16.38	16.00
Average	*29.31*	*13.03*	*14.43*	*17.67*	*15.23*	*15.73*

No. 1 Machinery Cast Scrap at Cincinnati

(Per Net Ton)

	1920	1921	1922	1923	1924	1925
January	$31.75	$17.75	$14.00	$20.39	$20.50	$20.12
February	33.50	15.50	13.63	21.75	21.50	19.12
March	34.75	13.90	14.05	23.65	20.00	18.35
April	35.50	13.50	15.50	24.75	18.00	17.75
May	35.50	13.50	16.25	24.05	16.75	17.75
June	35.50	13.10	16.25	22.13	17.13	18.15
July	35.50	12.00	16.25	20.25	18.25	18.25
August	35.50	12.00	17.45	19.05	18.25	19.00
September	35.30	12.80	19.88	19.38	18.13	19.25
October	35.00	14.00	21.25	18.00	17.68	19.00
November	26.75	14.00	20.85	16.85	18.40	20.12
December	23.80	14.00	20.75	18.00	18.75	20.00
Average	*33.20*	*13.84*	*17.17*	*20.69*	*18.69*	*18.91*

Scrap Prices at Chicago, 1910 to 1925

Heavy Melting Steel Scrap, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$16.00	$11.75	$10.75	$12.60	$9.35	$9.19	$15.50	$21.12	$30.00	$17.40	$24.50	$15.13	$11.45	$19.15	$17.69	$19.44
February	15.50	12.06	10.75	12.13	10.50	9.56	14.75	21.50	30.25	15.06	25.00	15.13	11.38	20.33	17.88	17.69
March	15.00	12.15	10.94	12.08	9.81	9.63	16.50	23.70	29.87	15.63	24.25	12.50	12.38	23.50	16.56	16.45
April	14.44	11.75	11.56	12.50	9.80	9.15	16.50	27.00	28.75	16.41	23.75	11.00	13.75	22.50	14.10	14.81
May	13.56	10.50	12.05	11.25	9.69	9.37	15.94	28.70	28.80	15.62	23.00	11.50	14.95	19.70	13.75	15.00
June	13.15	10.38	12.12	10.44	9.75	9.44	14.80	36.50	29.00	16.69	22.95	10.81	14.56	17.88	13.63	15.75
July	12.38	10.69	11.69	10.50	9.75	10.40	14.50	33.00	29.00	19.40	24.13	10.00	15.25	17.05	14.90	15.60
August	12.25	11.05	12.25	10.56	9.69	11.56	15.25	29.60	29.00	20.88	25.35	10.60	15.95	16.00	15.50	16.44
September	12.25	10.70	12.81	10.06	9.19	11.75	16.06	31.25	29.00	19.10	24.81	11.31	18.13	16.31	16.40	16.35
October	12.25	10.00	13.95	10.00	8.50	11.75	16.81	26.00	29.00	18.25	21.50	12.44	18.40	14.15	16.13	16.00
November	12.25	9.75	13.69	9.56	8.06	13.44	20.60	27.60	28.50	20.88	18.45	12.25	17.31	14.00	17.13	16.00
December	12.10	10.25	12.88	9.00	8.43	15.63	23.00	28.37	22.75	21.80	16.20	11.13	17.25	16.06	18.95	15.75
Average	*13.43*	*10.92*	*12.12*	*10.89*	*9.38*	*10.91*	*16.68*	*27.86*	*28.66*	*18.09*	*22.82*	*11.98*	*15.06*	*18.05*	*16.05*	*16.27*

Old Steel Rerolling Rails, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$18.00	$13.69	$13.00	$16.15	$11.10	$9.62	$17.06	$27.00	$35.00	$22.10	$34.25	$15.63	$12.10	$20.40	$18.88	$21.75
February	18.00	13.63	12.80	15.50	11.81	9.87	17.06	27.00	35.00	16.44	34.38	15.50	12.00	21.75	20.13	19.25
March	17.80	13.65	12.75	15.00	11.56	10.25	17.65	28.00	34.75	16.38	32.30	13.30	13.31	24.63	19.13	17.86
April	17.69	13.44	12.88	14.63	11.50	10.25	18.00	32.62	33.50	17.55	32.13	12.63	14.50	23.75	16.30	16.00
May	17.12	13.49	13.50	13.95	11.31	10.25	17.38	36.50	34.00	17.75	31.75	13.40	15.70	21.70	15.00	16.88
June	16.50	12.38	13.50	12.69	11.50	10.25	15.85	46.90	34.00	18.75	32.65	12.94	15.25	19.25	14.81	17.85
July	15.88	12.25	13.50	12.25	11.50	10.30	15.25	45.19	34.00	25.15	35.00	12.25	16.13	18.00	15.50	17.44
August	15.31	12.65	14.00	12.12	11.50	12.25	15.80	39.20	34.00	29.50	38.00	12.45	16.90	17.50	16.19	19.00
September	15.25	12.75	15.00	12.25	10.75	13.35	17.06	39.75	34.00	26.80	38.13	13.13	19.38	17.38	17.30	19.25
October	15.25	12.44	16.30	12.15	10.00	13.31	18.81	34.75	34.00	27.19	33.44	14.00	20.30	15.80	17.06	18.88
November	15.06	12.30	16.50	12.00	9.50	14.44	24.50	34.80	33.50	31.25	22.90	13.80	18.38	15.06	18.19	19.44
December	14.20	12.50	16.50	11.33	9.50	16.63	28.63	35.25	27.50	31.90	16.90	12.63	17.75	17.00	20.36	19.10
Average	*16.34*	*12.93*	*14.19*	*13.34*	*10.96*	*11.73*	*18.59*	*35.58*	*33.60*	*23.40*	*31.90*	*13.47*	*15.98*	*19.35*	*17.40*	*18.56*

No. 1 Railroad Wrought, per Net Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$14.88	$11.75	$11.63	$12.70	$8.70	$8.69	$15.88	$23.50	$31.25	$19.10	$26.00	$13.63	$10.50	$17.75	$15.31	$17.44
February	14.69	12.00	11.30	12.19	9.50	8.87	14.94	23.75	31.25	15.13	27.00	13.50	10.44	18.38	15.38	16.13
March	14.45	12.30	11.44	12.13	9.06	9.00	16.20	25.90	30.75	15.88	27.10	11.60	11.50	20.88	14.06	14.60
April	14.19	11.69	12.31	12.38	9.00	8.65	17.00	30.35	30.20	16.05	27.25	10.00	12.13	20.00	12.75	13.00
May	12.87	11.38	12.75	11.25	9.00	8.94	16.50	32.60	29.75	15.69	26.38	10.40	12.90	17.60	12.00	13.44
June	12.75	11.25	12.57	10.56	9.00	9.00	15.20	41.00	29.75	16.87	25.25	9.63	12.69	15.50	11.56	14.65
July	12.44	11.00	12.06	10.55	9.00	9.15	14.94	37.75	29.75	18.60	24.88	9.25	13.63	14.60	12.80	14.19
August	11.94	11.10	12.50	10.62	8.94	10.44	15.30	33.70	29.75	20.75	24.75	10.45	14.75	14.25	13.75	16.00
September	11.94	10.94	13.13	10.19	8.37	11.00	16.38	35.50	29.75	19.50	23.88	11.50	17.62	15.63	14.80	15.50
October	11.75	10.44	14.25	9.60	7.87	11.19	17.50	28.75	30.36	19.38	20.25	13.00	17.75	13.20	14.25	14.38
November	11.94	10.20	13.50	9.00	7.56	12.94	21.00	30.90	28.68	22.88	16.85	12.20	15.81	12.50	15.50	15.63
December	11.65	10.75	13.06	8.50	7.90	15.38	25.13	31.25	24.62	24.10	14.60	10.44	15.13	15.00	16.81	13.95
Average	*12.96*	*11.23*	*12.54*	*10.81*	*8.66*	*10.27*	*17.16*	*31.25*	*29.66*	*18.66*	*23.68*	*11.30*	*13.74*	*16.27*	*14.08*	*14.91*

No. 1 Machinery Cast Scrap, per Net Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$14.88	$12.19	$11.25	$12.90	$10.20	$9.19	$13.31	$15.50	$25.90	$22.95	$37.25	$17.25	$12.90	$21.60	$20.38	$19.88
February	14.88	12.13	11.25	12.69	10.87	9.00	12.81	15.37	26.06	20.00	38.88	18.00	13.25	23.63	21.00	18.75
March	14.50	12.25	11.31	12.50	10.37	9.00	13.45	16.90	27.25	21.63	37.85	14.90	14.13	26.25	20.13	18.20
April	13.69	11.81	12.06	12.44	10.25	9.00	12.88	20.43	27.12	21.45	37.25	13.25	14.88	25.75	18.40	17.25
May	13.13	11.00	12.20	11.60	10.06	9.00	12.56	23.20	26.70	20.12	37.38	13.60	16.20	23.30	17.38	16.88
June	13.00	10.75	11.81	10.63	9.75	9.00	11.75	30.00	27.12	20.75	36.30	12.75	16.06	21.75	16.75	17.50
July	13.00	10.50	11.75	10.70	9.65	9.25	11.50	29.25	28.06	23.30	36.50	12.25	17.00	19.60	16.90	17.50
August	12.75	10.55	12.15	10.87	9.50	9.62	11.50	24.20	29.10	24.50	36.20	12.60	18.60	18.00	17.50	17.63
September	12.75	10.10	12.81	10.62	9.19	10.10	12.13	23.75	30.00	24.20	34.00	13.44	21.38	19.63	18.20	17.90
October	12.50	10.25	14.20	10.40	9.00	10.50	13.50	20.50	30.36	25.00	28.75	13.88	20.80	18.70	17.50	17.63
November	12.50	10.35	13.50	10.06	8.56	12.13	15.55	22.00	28.87	28.12	23.00	13.50	20.25	18.38	17.88	18.19
December	12.30	11.00	13.25	9.83	9.00	13.75	16.25	23.50	25.75	32.35	18.70	12.63	19.75	19.75	19.20	17.25
Average	*13.32*	*11.07*	*12.30*	*11.27*	*9.70*	*9.96*	*13.10*	*22.05*	*27.69*	*23.70*	*33.51*	*14.00*	*17.10*	*21.36*	*18.44*	*17.88*

Cast Borings, per Gross Ton

	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$10.08	$18.48	$12.54	$16.11	$10.92	$6.38	$15.57	$13.58	$15.56
February	10.15	18.48	8.75	16.39	11.76	6.93	16.59	15.55	14.63
March	10.64	18.48	10.15	15.74	8.40	8.05	18.91	14.38	13.85
April	11.83	17.99	10.47	15.96	7.28	9.24	17.92	11.40	10.94
May	13.44	17.53	9.31	14.43	6.61	10.98	16.24	10.00	10.00
June	19.60	17.77	9.33	13.38	5.60	11.63	14.43	10.06	10.70
July	20.01	18.48	12.71	14.15	5.32	12.67	13.66	10.45	11.13
August	18.36	18.48	14.28	15.06	5.38	12.88	12.04	10.69	12.75
September	18.20	18.48	13.55	14.65	5.60	14.43	12.19	11.80	13.15
October	15.75	18.48	11.63	12.88	6.44	14.90	10.42	11.56	12.75
November	17.25	16.80	12.88	11.93	6.83	14.56	10.08	12.63	13.19
December	18.05	14.84	14.17	10.98	6.09	14.56	12.04	14.36	13.50
Average	*15.28*	*17.94*	*11.65*	*14.30*	*7.19*	*11.43*	*14.17*	*12.21*	*12.68*

Steel Knuckles and Couplers, per Gross Ton

	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$25.20	$37.52	$24.51	$27.44	$16.39	$12.77	$24.98	$21.21	$22.88
February	25.20	36.89	19.32	29.68	16.11	12.39	26.53	21.77	21.00
March	26.60	35.00	19.60	27.66	13.55	14.12	28.71	20.00	18.70
April	30.67	34.00	19.21	26.32	12.47	15.68	27.93	17.40	17.63
May	33.71	34.00	17.36	25.48	13.66	16.69	25.42	17.00	17.63
June	43.83	34.00	18.20	25.20	13.16	15.89	22.55	16.63	19.00
July	45.92	34.00	20.50	27.16	11.63	17.92	21.00	17.20	18.19
August	44.24	34.00	23.52	29.01	12.21	19.21	20.87	18.00	19.50
September	40.88	34.00	21.95	27.72	13.03	21.84	21.56	19.35	19.50
October	33.38	34.00	21.43	24.51	14.84	22.96	18.92	18.25	18.63
November	33.04	34.00	23.39	20.83	14.28	21.84	17.64	19.63	18.75
December	35.67	32.55	24.86	16.95	12.60	22.12	19.88	22.78	18.25
Average	*34.86*	*34.50*	*21.15*	*25.67*	*13.66*	*17.79*	*23.00*	*19.10*	*19.14*

Railroad Malleable Scrap at Chicago, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$16.80	$12.25	$12.19	$15.01	$10.36	$9.11	$15.47	$19.88	$30.02	$19.71	$32.48	$16.52	$12.77	$25.26	$20.93	$21.13
February	16.45	11.76	11.54	14.56	11.63	8.96	14.93	19.39	30.02	16.65	33.53	17.36	12.81	26.75	21.77	20.00
March	16.24	12.32	11.69	14.56	10.71	8.89	15.62	20.10	31.24	18.07	31.92	15.46	13.87	28.56	21.00	19.10
April	15.33	12.32	12.53	14.77	10.25	8.96	15.56	22.81	31.64	17.70	30.95	13.59	15.68	28.00	19.30	17.50
May	14.49	11.63	12.94	13.55	10.24	9.12	15.05	26.10	32.82	17.08	29.68	14.11	16.80	25.54	18.13	17.63
June	13.66	11.31	13.16	12.39	10.08	9.11	13.14	35.41	33.04	17.92	28.73	12.88	16.73	24.08	16.88	18.00
July	12.60	11.20	13.16	11.87	10.08	9.97	13.03	33.73	33.28	20.94	30.24	12.53	17.51	22.51	17.00	17.88
August	12.32	11.26	13.50	11.63	9.95	11.20	12.60	33.26	34.01	22.96	32.20	13.44	19.04	20.59	17.38	19.13
September	12.54	11.20	14.07	11.41	9.24	11.48	12.88	34.44	34.01	21.22	30.95	14.63	23.67	21.71	18.20	19.10
October	12.32	10.85	15.40	10.81	8.85	11.48	13.87	28.28	34.01	21.35	26.32	15.12	24.42	19.60	18.13	18.50
November	12.60	10.64	15.19	10.43	8.68	12.75	17.92	28.67	32.68	25.89	21.78	14.67	23.11	18.91	19.00	19.19
December	12.60	11.27	15.12	10.08	8.90	15.40	20.16	30.63	25.48	28.78	16.80	12.81	22.40	20.23	20.28	18.30
Average	*14.00*	*11.50*	*13.37*	*12.59*	*9.91*	*10.53*	*15.02*	*27.72*	*31.85*	*20.85*	*28.80*	*14.43*	*18.23*	*23.48*	*19.00*	*18.79*

Old Cast Iron Carwheels at Chicago, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$18.38	$13.00	$13.25	$16.95	$11.65	$9.94	$14.63	$18.87	$30.00	$25.90	$36.13	$21.00	$15.30	$26.70	$20.50	$21.38
February	17.88	13.00	13.05	16.75	12.44	10.00	13.94	18.25	30.00	22.75	38.06	20.63	15.00	27.25	21.00	19.38
March	17.00	13.25	13.00	16.75	11.88	9.94	14.30	20.25	30.00	21.50	36.20	15.90	16.50	28.38	21.00	17.10
April	16.50	13.25	13.25	16.75	11.55	9.75	13.88	23.62	29.00	21.50	37.50	14.06	18.63	27.75	16.70	16.00
May	15.75	12.75	13.90	15.05	11.50	9.75	12.95	27.35	29.00	21.25	37.50	14.70	18.50	24.10	16.25	16.06
June	15.50	12.55	14.13	13.94	11.50	10.19	12.44	39.00	29.00	22.00	35.90	13.31	18.25	21.88	15.63	17.30
July	14.81	12.50	13.88	12.90	11.25	11.30	12.50	35.25	29.00	23.95	35.75	12.75	19.25	20.60	16.40	17.12
August	14.50	12.85	13.70	12.75	11.25	11.04	11.60	30.40	29.00	26.25	38.35	12.95	20.60	19.50	17.13	17.50
September	14.00	12.81	14.38	12.63	11.06	11.80	11.69	31.87	29.00	24.90	37.69	14.19	23.75	19.75	18.20	17.70
October	14.00	12.50	16.00	12.10	10.65	12.00	12.94	25.75	29.00	24.88	36.06	16.50	25.10	17.90	17.63	17.38
November	13.50	12.10	16.69	12.00	9.81	13.31	17.30	28.15	29.00	28.63	31.95	16.60	24.63	17.88	18.63	18.31
December	13.50	13.06	16.75	11.88	9.60	14.56	21.25	31.00	26.75	31.10	24.40	15.75	24.00	19.75	20.70	18.30
Average	*15.44*	*12.80*	*14.33*	*14.20*	*11.18*	*11.13*	*14.12*	*27.48*	*29.06*	*24.55*	*35.46*	*15.70*	*19.96*	*22.62*	*18.31*	*17.79*

Philadelphia Scrap Prices, 1910 to 1925, Delivered Eastern Pennsylvania

Heavy Melting Steel Scrap, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.00	$12.50	$12.19	$14.40	$10.40	$10.00	$16.38	$21.70	$30.00	$17.20	$24.75	$14.50	$11.60	$19.70	$18.20	$18.50
February	16.62	13.50	11.70	12.87	11.00	10.00	16.50	20.63	30.00	14.75	25.62	14.25	12.00	20.75	18.38	17.63
March	16.50	14.05	11.80	13.25	11.31	10.80	16.90	23.50	29.00	14.19	25.20	13.00	12.78	25.25	16.75	15.90
April	16.12	13.31	12.94	13.34	10.95	11.00	17.88	24.88	28.00	15.50	24.12	11.25	14.00	23.63	15.30	14.63
May	14.75	13.00	13.50	12.10	10.63	11.25	16.60	25.40	29.00	15.00	23.37	11.80	14.75	19.80	14.75	14.63
June	14.45	13.00	13.50	11.75	10.50	11.10	15.31	34.13	29.00	16.12	22.60	11.25	15.00	17.88	15.00	15.10
July	14.12	13.19	13.50	11.35	10.30	12.06	14.94	35.20	29.00	18.90	22.62	11.00	15.00	16.60	15.40	15.63
August	13.75	13.15	13.65	11.43	10.19	13.75	14.75	31.88	29.00	19.37	25.00	11.40	15.20	16.00	16.75	16.38
September	13.85	12.50	14.50	11.62	10.69	15.00	14.75	30.25	29.00	18.62	25.62	11.50	16.88	16.75	17.10	17.20
October	13.81	11.94	15.10	11.15	9.95	14.75	15.63	25.00	29.00	19.10	22.75	12.06	17.80	15.40	16.63	16.75
November	13.50	11.55	15.50	10.19	9.25	14.65	20.13	26.00	28.00	20.62	19.00	11.88	16.25	15.25	17.75	17.38
December	12.65	12.08	15.25	10.00	9.40	13.81	23.75	28.20	25.00	22.50	15.25	11.50	16.38	16.75	20.10	17.50
Average	*14.76*	*12.81*	*13.69*	*11.96*	*10.38*	*12.51*	*16.96*	*27.23*	*28.67*	*17.66*	*22.99*	*12.12*	*14.80*	*18.65*	*16.84*	*16.44*

No. 1 Machinery Cast Scrap, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.00	$14.00	$13.42	$14.50	$12.00	$12.00	$17.00	$20.20	$30.00	$23.80	$36.00	$23.25	$16.50	$23.20	$20.70	$20.13
February	16.12	14.38	13.00	14.37	12.88	12.00	17.00	20.00	30.00	23.00	40.00	23.00	16.50	24.25	20.25	18.88
March	16.00	14.40	13.12	14.00	13.00	12.00	17.00	21.75	30.00	21.25	39.20	19.40	17.13	28.25	18.63	18.00
April	15.87	13.44	13.62	13.94	13.00	11.75	17.88	26.63	29.00	22.00	38.00	18.00	17.25	26.25	17.70	17.25
May	15.06	13.13	13.75	13.60	12.25	12.13	17.50	29.00	29.00	21.50	37.75	18.00	18.40	24.30	17.00	17.00
June	15.00	13.00	13.75	13.25	12.00	12.25	16.50	33.50	29.00	22.00	37.00	17.38	19.00	22.25	17.50	17.50
July	14.94	13.06	13.75	13.00	12.00	12.38	16.00	36.30	29.00	22.10	37.50	16.50	17.50	20.40	17.50	17.63
August	14.25	13.20	13.75	12.87	12.00	13.30	16.00	33.25	29.00	24.75	39.00	17.00	18.60	20.38	17.88	18.00
September	14.00	12.69	14.96	12.81	12.00	14.00	16.00	31.00	29.00	25.00	39.25	17.00	21.50	21.38	18.00	18.00
October	14.00	12.44	14.50	13.50	11.40	14.00	16.15	28.00	29.00	25.20	38.75	17.13	22.60	19.50	17.50	18.00
November	14.00	12.25	14.75	12.62	11.00	14.50	18.50	30.00	29.00	27.62	33.80	17.50	21.00	19.25	17.38	18.00
December	14.00	13.00	15.00	12.17	11.30	16.06	20.75	30.60	29.00	30.75	24.50	16.63	20.25	20.25	19.50	18.13
Average	*15.02*	*13.25*	*13.95*	*13.39*	*12.07*	*13.03*	*17.19*	*28.35*	*29.25*	*24.08*	*36.73*	*18.49*	*18.85*	*22.47*	*18.34*	*18.04*

No. 1 Railroad Wrought, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$19.56	$15.63	$15.37	$16.10	$13.05	$12.00	$22.00	$26.60	$35.00	$24.20	$33.50	$20.00	$14.50	$22.10	$20.90	$20.88
February	18.94	16.06	14.00	15.12	14.38	12.00	21.63	25.50	35.00	21.50	36.00	19.75	14.63	24.75	21.50	20.13
March	19.00	17.20	14.12	15.25	14.00	12.50	22.13	30.75	35.00	20.25	35.90	17.20	15.38	27.50	19.00	18.90
April	18.69	16.06	15.44	15.37	13.25	12.69	23.38	36.00	35.00	21.60	35.00	17.00	15.88	27.00	18.10	17.75
May	17.50	15.25	15.75	15.00	12.63	12.94	22.50	41.40	34.00	21.00	33.50	15.20	16.90	24.20	16.63	17.50
June	16.70	15.00	15.44	14.75	12.50	13.00	20.50	51.25	34.00	21.50	33.00	14.38	17.00	22.50	16.50	18.10
July	16.00	15.13	15.50	13.90	12.20	13.44	19.50	50.60	34.00	24.40	33.00	13.50	17.13	18.80	17.70	17.63
August	15.37	15.70	15.80	14.00	12.00	14.95	20.20	45.00	34.00	26.50	33.00	14.00	18.00	18.00	18.63	17.50
September	16.10	14.75	16.31	14.68	12.38	16.50	20.00	44.00	34.00	26.50	33.25	15.00	20.88	18.50	19.00	17.70
October	16.19	13.94	16.80	14.00	11.80	16.13	21.63	37.20	34.00	26.90	29.25	15.88	22.20	17.50	18.00	18.13
November	16.00	13.85	17.06	13.00	11.50	16.50	24.13	35.00	34.00	28.37	25.00	16.00	19.00	17.38	18.38	18.50
December	15.90	15.00	16.25	12.75	11.50	20.06	26.75	35.00	33.00	30.25	20.00	14.63	19.25	18.50	20.40	18.50
Average	*17.16*	*15.30*	*15.65*	*14.49*	*12.60*	*14.39*	*22.03*	*38.19*	*34.25*	*24.41*	*31.70*	*16.04*	*17.56*	*21.39*	*18.73*	*18.44*

Old Cast Iron Carwheels, per Gross Ton

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$17.50	$13.00	$12.37	$16.20	$12.20	$11.00	$16.38	$21.50	$30.00	$24.60	$36.00	$25.00	$16.50	$22.30	$20.10	$19.50
February	16.81	13.44	12.00	15.37	12.63	10.63	16.50	20.50	30.00	23.00	40.62	24.00	15.00	24.75	20.38	18.38
March	16.75	14.00	11.94	15.00	12.50	11.00	16.70	21.50	30.00	23.00	42.40	18.50	15.94	26.50	18.75	18.50
April	16.06	13.19	12.87	14.87	12.00	11.00	17.38	25.75	29.00	23.10	40.00	18.00	15.88	26.50	17.50	17.75
May	15.12	13.00	13.90	13.75	11.75	11.38	16.70	28.00	29.00	21.00	40.00	16.80	16.70	24.20	17.00	17.00
June	14.90	13.10	14.00	13.12	11.19	11.55	16.38	34.00	29.00	22.00	38.00	18.00	17.13	22.75	17.00	17.00
July	14.25	12.94	14.00	12.30	11.00	12.38	15.63	36.20	29.00	23.20	38.50	16.50	17.50	20.40	17.30	17.25
August	13.94	13.00	14.05	12.37	11.25	13.25	15.50	34.50	29.00	24.50	40.60	16.40	18.10	20.25	17.75	18.50
September	13.75	12.56	14.25	12.75	11.25	14.00	15.50	32.50	29.00	24.50	42.75	17.00	21.75	21.00	18.00	18.50
October	13.75	11.75	14.87	12.46	10.10	13.75	15.88	29.00	29.00	24.50	40.50	17.00	22.50	19.60	17.50	18.50
November	13.50	11.35	15.00	12.00	9.50	14.05	18.88	31.25	29.00	27.75	36.40	17.20	20.50	17.75	17.88	18.50
December	13.25	12.33	15.50	12.00	10.00	15.63	22.38	32.40	28.00	30.50	26.00	16.63	20.00	19.50	19.20	18.50
Average	*14.97*	*12.81*	*13.73*	*13.52*	*11.28*	*12.47*	*16.98*	*28.93*	*29.17*	*24.30*	*38.48*	*18.48*	*18.13*	*22.18*	*18.20*	*18.16*

Metals, Tin Plate and Galvanized Sheets for Sixteen Years

Lake Copper at New York, Cents per Pound (1920 to 1925 Prices are Electrolytic Copper)

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	14.00	12.81	14.50	16.98	14.85	14.02	24.39	29.73	23.50	20.48	19.27	12.95	13.55	14.52	12.46	14.73
February	13.78	12.75	14.41	16.55	15.00	15.21	26.85	34.90	23.50	17.86	19.02	12.84	12.92	15.34	12.73	14.49
March	13.75	12.58	14.88	15.05	14.79	15.75	27.10	35.85	23.50	15.46	18.50	12.19	12.68	16.84	13.52	14.06
April	13.31	12.41	16.00	15.67	14.75	18.90	28.27	31.67	23.50	15.55	19.19	12.49	12.61	16.81	13.21	13.30
May	13.06	12.33	16.30	15.91	14.40	21.00	28.88	31.42	23.50	16.18	19.05	12.79	13.13	15.54	12.76	13.34
June	12.88	12.71	17.53	15.42	14.12	23.38	27.82	32.46	23.50	17.95	19.00	12.88	13.62	14.74	12.35	13.41
July	12.66	12.78	17.54	14.78	13.70	21.98	25.84	28.78	25.80	22.07	19.00	12.46	13.71	14.39	12.39	13.95
August	12.93	12.75	17.73	15.86	12.85	19.33	26.95	27.24	26.00	23.16	19.00	11.70	13.74	13.87	13.26	14.48
September	12.81	12.65	17.77	16.77	12.66	17.97	28.03	24.90	26.00	22.68	18.70	12.01	13.75	13.36	12.97	14.42
October	12.84	12.53	17.80	16.85	11.73	17.89	28.48	23.50	26.00	22.13	16.56	12.67	13.66	12.58	12.96	14.29
November	12.98	12.80	17.70	16.16	12.00	18.92	32.32	23.50	26.00	20.69	14.63	13.07	13.62	12.76	13.59	14.36
December	13.00	13.84	17.69	14.88	13.35	20.24	33.38	23.50	25.40	18.90	13.63	13.55	14.00	12.88	14.23	13.82
Average	*13.17*	*12.75*	*16.65*	*15.82*	*13.68*	*18.72*	*28.19*	*28.95*	*24.68*	*19.43*	*17.96*	*12.63*	*13.42*	*14.47*	*13.04*	*14.05*

Spelter (Zinc) at New York, Cents per Pound

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	6.26	5.55	6.52	7.15	5.29	6.59	18.19	9.94	7.88	7.38	9.62	5.82	5.06	7.28	6.78	8.10
February	5.89	5.56	6.71	6.45	5.40	8.84	20.13	10.48	7.99	6.70	9.14	5.36	4.85	7.58	7.11	7.86
March	5.72	5.65	6.98	6.26	5.28	9.29	18.40	10.77	7.64	6.52	8.93	5.20	5.00	8.19	6.85	7.68
April	5.60	5.51	6.86	5.77	5.18	11.22	18.58	9.85	7.01	6.51	8.63	5.24	5.25	7.65	6.49	7.35
May	5.20	5.50	6.86	5.47	5.06	16.14	15.86	9.46	7.32	6.46	8.08	5.28	5.45	6.99	6.13	7.30
June	5.19	5.63	6.99	5.18	5.09	22.18	12.75	9.62	8.01	6.93	7.92	4.95	5.69	6.40	6.14	7.35
July	5.20	5.79	7.26	5.38	5.02	20.58	9.83	8.95	8.69	7.90	8.18	4.77	6.12	6.43	6.25	7.60
August	5.26	6.04	7.19	5.75	5.60	14.11	8.98	8.69	8.96	7.84	8.31	4.69	6.59	6.68	6.53	7.55
September	5.53	6.03	7.53	5.82	5.50	14.16	8.22	8.34	9.60	7.57	7.82	4.74	6.91	6.81	6.54	8.12
October	5.69	6.20	7.57	5.42	4.97	13.96	9.98	8.24	9.11	7.83	7.51	5.10	7.20	6.66	6.67	8.65
November	5.95	6.60	7.48	5.29	5.12	17.15	11.90	7.95	8.70	8.14	6.84	5.18	7.48	6.70	7.14	9.04
December	5.80	6.44	7.33	5.18	5.71	16.69	11.13	7.84	8.45	8.59	6.00	5.35	7.46	6.60	7.73	8.97
Average	*5.61*	*5.88*	*7.11*	*5.76*	*5.27*	*14.24*	*13.66*	*9.18*	*8.28*	*7.36*	*8.08*	*5.13*	*6.09*	*7.00*	*6.70*	*7.96*

Lead, at New York, Cents per Pound

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	4.70	4.50	4.41	4.35	4.11	3.74	5.93	7.69	6.87	5.56	8.67	5.00	4.70	7.85	8.31	10.26
February	4.63	4.46	4.00	4.35	4.06	3.82	6.23	9.13	7.04	5.05	8.88	4.54	4.70	8.14	9.01	9.38
March	4.51	4.41	4.08	4.35	3.97	4.04	7.43	9.47	7.24	5.23	9.21	4.08	4.71	8.47	9.23	8.90
April	4.40	4.44	4.20	4.40	3.82	4.20	7.73	9.43	6.95	5.03	8.95	4.33	5.13	8.19	8.19	8.01
May	4.37	4.40	4.20	4.37	3.90	4.25	7.45	11.00	6.88	5.05	8.55	4.99	5.51	7.39	7.27	8.08
June	4.38	4.46	4.50	4.35	3.90	5.89	6.87	11.68	7.55	5.34	8.48	4.56	5.73	7.14	7.08	8.35
July	4.40	4.50	4.67	4.37	3.90	5.59	6.34	10.72	8.04	5.65	8.67	4.40	5.75	6.28	7.15	8.33
August	4.40	4.50	4.54	4.64	3.87	4.68	6.26	10.72	8.05	5.77	8.98	4.40	5.88	6.74	8.02	9.52
September	4.40	4.49	5.04	4.73	3.86	4.62	6.88	8.84	8.05	6.12	8.11	4.60	6.20	7.06	8.09	9.60
October	4.40	4.31	5.06	4.52	3.52	4.60	7.00	6.77	8.05	6.45	7.24	4.70	6.67	6.84	8.31	9.62
November	4.44	4.31	4.66	4.33	3.68	5.16	7.13	6.44	8.05	6.76	6.33	4.70	7.20	6.87	8.96	9.84
December	4.50	4.45	4.32	4.06	3.80	5.33	7.60	6.48	6.71	7.03	4.80	4.70	7.28	7.61	9.61	9.36
Average	*4.46*	*4.44*	*4.47*	*4.40*	*3.87*	*4.66*	*6.90*	*9.03*	*7.46*	*5.76*	*8.07*	*4.58*	*5.79*	*7.39*	*8.27*	*9.10*

Straits Tin, at New York, Cents per Pound

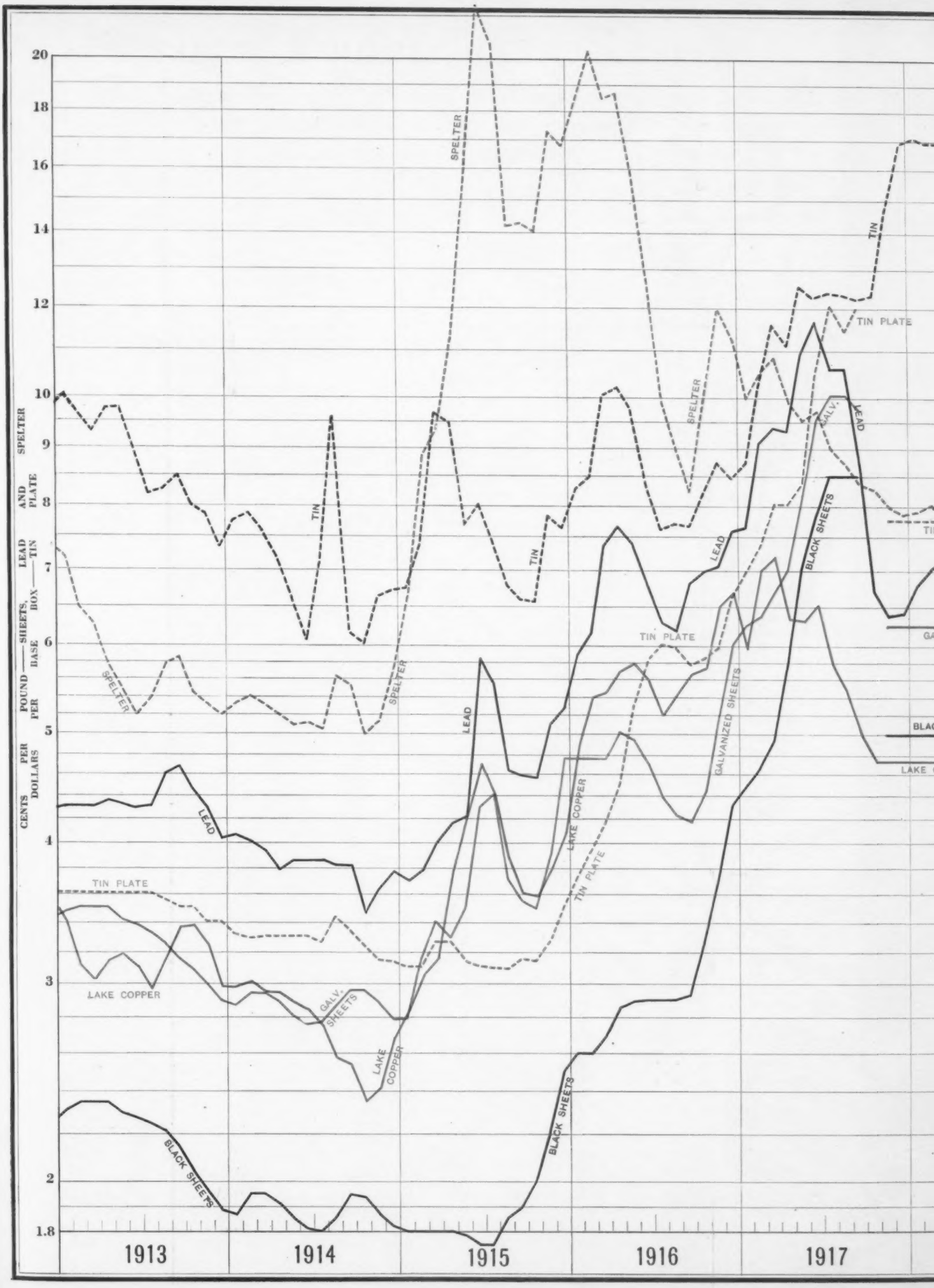
	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	32.61	41.20	44.58	50.34	39.12	34.13	41.76	44.10	85.13	71.50	62.74	35.94	32.03	39.16	48.70	58.26
February	32.65	43.34	43.56	48.71	39.82	37.25	42.60	51.47	85.00	72.45	59.87	32.16	30.74	41.98	53.41	57.09
March	32.51	41.10	42.76	46.93	38.03	48.73	50.53	58.38	85.00	72.50	61.93	28.79	29.14	48.61	55.03	53.67
April	32.83	42.05	43.64	49.04	36.10	47.64	51.51	55.82	88.53	72.50	62.12	30.36	30.58	45.84	50.02	52.27
May	33.05	43.32	45.98	49.06	33.21	38.79	49.14	63.21	100.00	72.50	54.99	32.50	30.92	43.11	44.08	54.65
June	32.79	46.25	47.44	45.01	30.60	40.26	42.07	61.93	91.00	71.83	48.34	29.39	31.46	40.97	42.74	55.93
July	32.99	43.23	44.70	41.32	35.65	37.38	38.25	62.61	93.00	70.11	49.29	27.69	31.67	38.47	46.29	58.05
August	33.92	43.38	45.86	41.63	48.34	34.37	38.88	62.53	91.33	62.20	47.60	26.35	32.36	39.33	51.89	58.12
September	35.17	39.69	49.16	42.63	31.13	33.13	38.65	61.54	80.40	59.79	44.43	26.70	32.36	41.60	49.24	58.27
October	36.76	41.22	50.07	40.38	30.25	33.05	41.10	62.24	78.82	54.82	40.47	27.70	34.61	41.80	50.60	62.24
November	37.38	43.08	49.87	39.75	33.28	39.50	44.12	74.18	73.67	54.17	36.97	28.93	36.76	44.09	54.25	63.30
December	38.21	45.03	49.86	37.12	34.01	38.53	42.55	84.74	71.51	53.80	34.04	32.41	37.48	47.16	56.03	62.94
Average	*34.24*	*42.74*	*46.46*	*44.33*	*35.80*	*38.56*	*43.43*	*61.90*	*85.28*	*65.68*	*50.23*	*29.91*	*32.51*	*42.68*	*50.19*	*57.90*

Tin Plate, at Pittsburgh, Dollars per Base Box

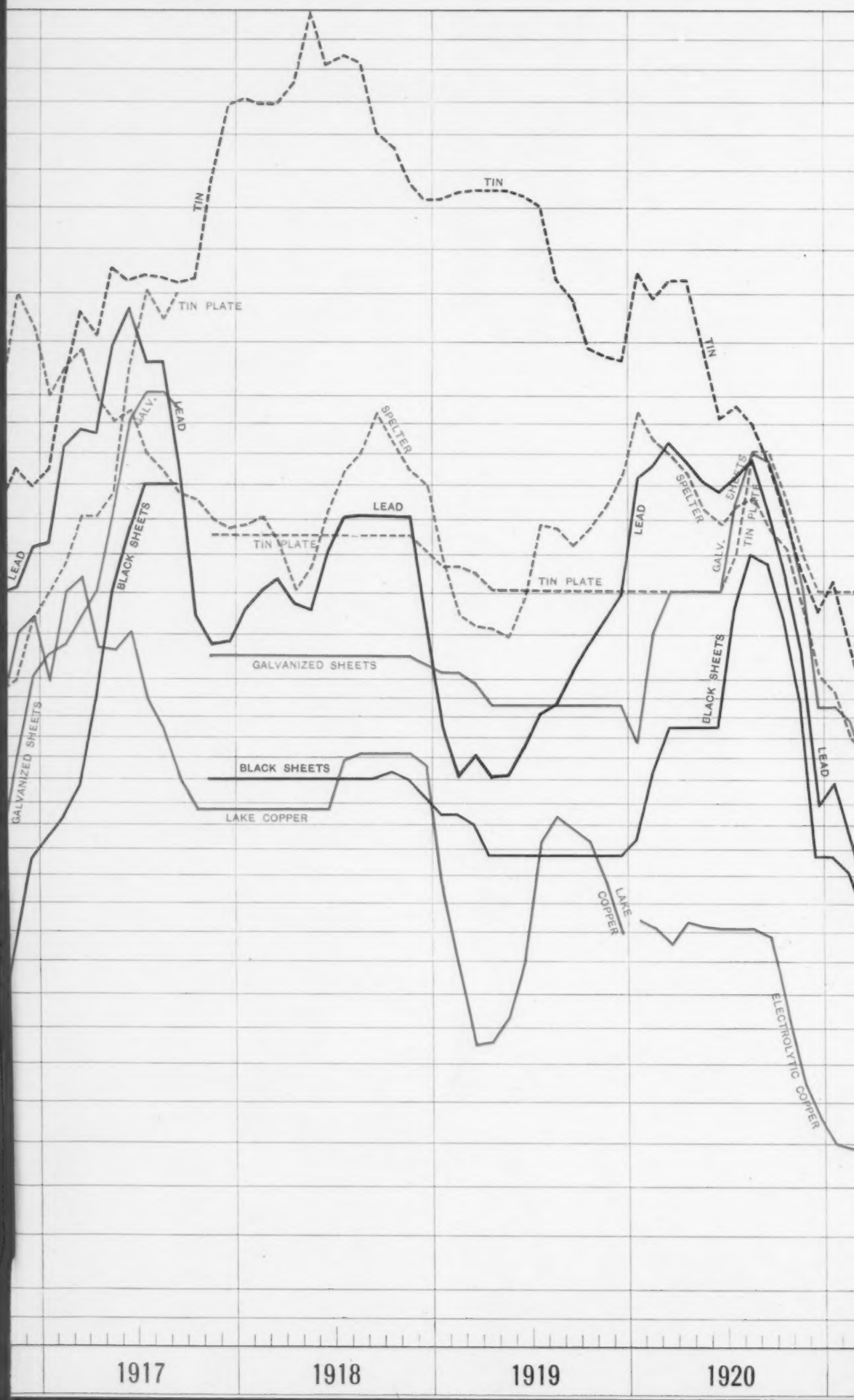
	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	$3.60	$3.60	$3.46	$3.60	$3.32	$3.10	$3.75	$7.00	$7.75	$7.35	$7.00	$7.00	$4.75	$4.75	$5.50	$5.50
February	3.60	3.67	3.35	3.60	3.29	3.10	3.96	7.38	7.75	7.35	7.00	7.00	4.71	4.80	5.50	5.50
March	3.60	3.70	3.30	3.60	3.30	3.25	4.19	8.00	7.75	7.26	7.00	7.00	4.60	5.23	5.50	5.50
April	3.60	3.70	3.30	3.60	3.30	3.25	4.50	8.00	7.75	7.00	7.00	6.44	4.75	6.00	5.50	5.50
May	3.60	3.70	3.33	3.60	3.30	3.15	5.30	8.40	7.75	7.00	7.00	6.25	4.75	5.70	5.50	5.50
June	3.60	3.70	3.40	3.60	3.30	3.11	5.81	10.50	7.75	7.00	7.00	6.25	4.75	5.50	5.50	5.50
July	3.60	3.70	3.43	3.60	3.27	3.10	6.00	12.00	7.75	7.00	7.50	5.69	4.75	5.50	5.50	5.50
August	3.60	3.70	3.50	3.55	3.41	3.10	5.95	11.40	7.75	7.00	9.00	5.25	4.75	5.50	5.50	5.50
September	3.60	3.67	3.58	3.50	3.35	3.15	5.75	12.00	7.75	7.00	9.00	5.25	4.75	5.50	5.50	5.50
October	3.60	3.52	3.60	3.50	3.24	3.15	5.81	....	7.75	7.00	8.33	5.13	4.75	5.50	5.50	5.50
November	3.60	3.40	3.60	3.40	3.15	3.28	5.97	7.75	7.75	7.00	7.50	4.75	4.75	5.50	5.50	5.50
December	3.60	3.40	3.60	3.40	3.13	3.52	6.63	7.75	7.55	7.00	7.00	4.73	4.75	5.50	5.50	5.50
Average	*3.60*	*3.62*	*3.45*	*3.55*	*3.28*	*3.19*	*5.30*	*9.11*	*7.73*	*7.08*	*7.53*	*5.90*	*4.73*	*5.43*	*5.50*	*5.50*

No. 28 Galvanized Sheets, at Pittsburgh, Cents per Pound

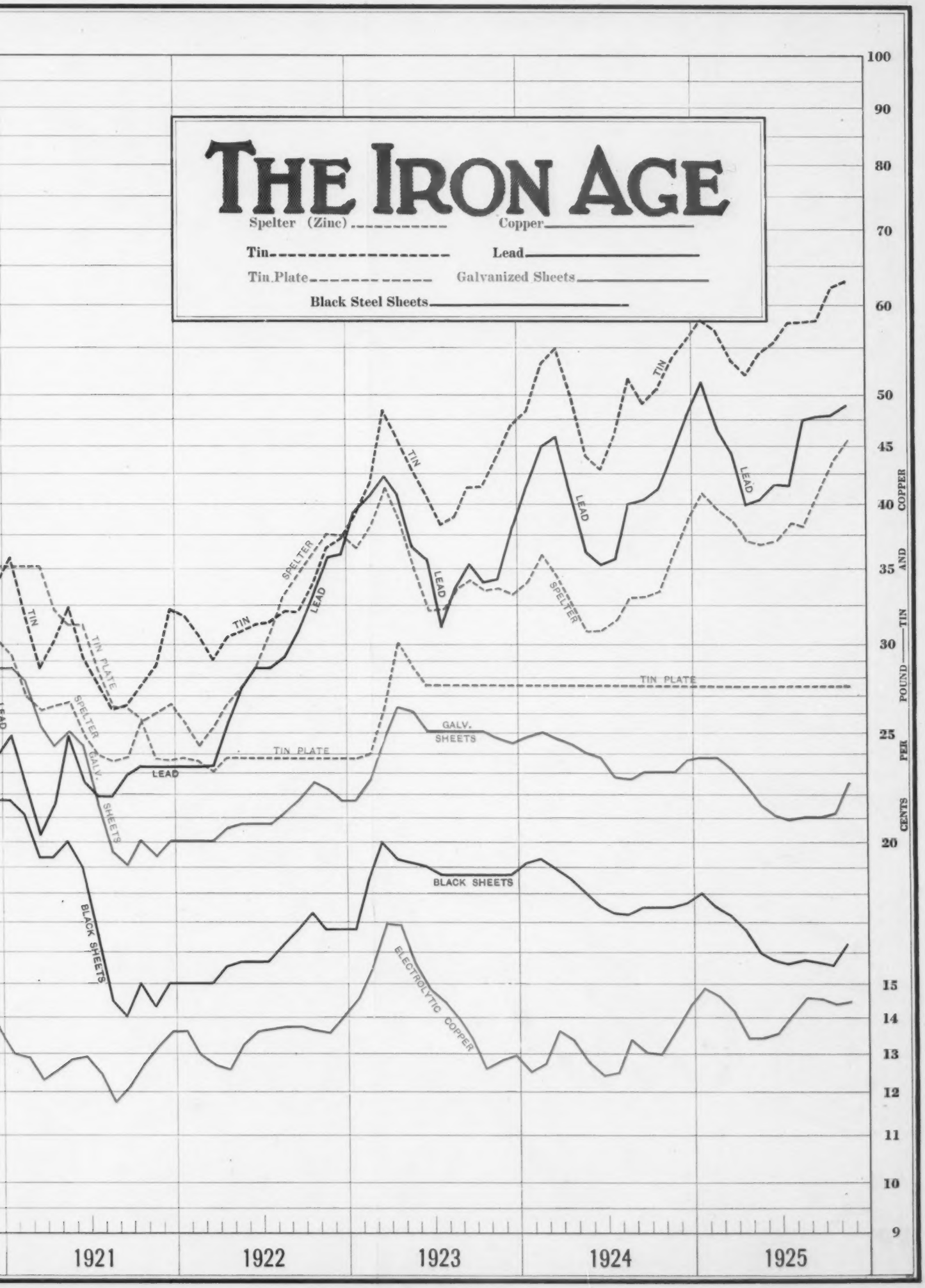
	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
January	3.67	3.59	3.55	3.50	3.20	2.90	3.46	2.87	2.79	4.75	6.25	6.25	6.05	5.33	5.70	4.00	4.35	4.98	4.75
February	3.75	3.55	3.51	3.50	3.20	2.87	3.50	2.95	3.16	4.75	6.38	6.25	6.05	6.50	5.56	4.00	4.54	5.00	4.75
March	3.75	3.55	3.26	3.50	3.20	2.80	3.50	2.95	3.40	4.75	6.69	6.25	5.96	7.00	5.05	4.00	4.93	4.93	4.62
April	3.75	3.55	3.25	3.50	3.20	2.86	3.50	2.91	3.29	5.00	7.00	6.25	5.70	7.00	4.88	4.11	5.25	4.88	4.45
May	3.75	3.55	3.25	3.50	3.20	2.90	3.42	2.80	3.50	4.94	8.20	6.25	5.70	7.00	5.00	4.15	5.20	4.80	4.29
June	3.75	3.55	3.25	3.50	3.00	2.90	3.38	2.75	4.28	4.69	9.50	6.25	5.70	7.00	4.88	4.15	5.00	4.76	4.21
July	3.75	3.55	3.25	3.39	3.00	3.00	3.33	2.75	4.40	4.38	10.00	6.25	5.70	8.25	4.31	4.15	5.00	4.56	4.19
August	3.75	3.55	3.25	3.30	2.99	3.12	3.24	2.85	3.71	4.21	10.00	6.25	5.70	9.00	3.90	4.23	5.00	4.55	4.20
September	3.75	3.55	3.28	3.21	2.93	3.21	3.16	2.95	3.56	4.18	9.75	6.25	5.70	8.88	3.81	4.35	5.00	4.60	4.20
October	3.75	3.55	3.35	3.20	2.85	3.36	3.08	2.95	3.50	4.41	...	6.25	5.70	8.18	4.00	4.50	5.00	4.60	4.23
November	3.75	3.55	3.43	3.20	2.85	3.40	2.98	2.88	3.89	5.18	6.25	6.25	5.70	7.04	3.86	4.43	4.93	4.60	4.50
December	3.75	3.55	3.50	3.19	2.89	3.40	2.90	2.78	4.75	6.00	6.25	6.15	5.70	5.70	4.00	4.35	4.89	4.72	4.60
Average	*3.74*	*3.55*	*3.34*	*3.37*	*3.04*	*3.06*	*3.29*	*2.87*	*3.69*	*4.77*	*7.84*	*6.24*	*5.78*	*7.24*	*4.58*	*4.20*	*4.92*	*4.75*	*4.42*



Carload Prices of Copper, Lead, Tin and Zi



r, Lead, Tin and Zinc in New York, and of Tin Plate and Black



ack and Galvanized Sheets in Pittsburgh

Machine Tool Industry Revives

Latter Part of 1925 Brings to Manufacturers of Metal-working Machinery the Largest Volume of Business Since 1920

IT is an axiom of the machine tool industry that it is the first to feel the effects of a business depression and the last to recover. This has again been borne out in the trade developments of 1925, which brought a measure of prosperity to American industry, in volume of orders at least, early in the year, but which did not fully reach the machine tool industry until the latter four months of the year.

The machine tool industry has not yet fully recovered from the effects of over-expansion during the war. While some of the plants which sprang up during the war have been abandoned and some companies not well entrenched financially have dropped by the wayside, there is still the problem confronting many old-established companies of getting a sufficient volume of orders to keep their expanded manufacturing facilities working at maximum capacity.

Having come to a realization, slowly and reluctantly in some cases, that large facilities cannot be employed 100 per cent even under conditions of general business prosperity, the wisely conducted companies in the machine tool business have "cut their cloth" accordingly, with the result that they are now in position to profit by even 50 or 60 per cent of what they formerly considered would mean a profitable volume of business.

No better example of post-war liquidation of surplus machine-tool manufacturing facilities can be cited than the action of the Niles-Bement-Pond Co. during the past year. Finding that it could not keep all of its plants sufficiently busy for profitable operation, the company first disposed of its Philadelphia works, selling the equipment in the open market and later the building, and more recently giving up its Plainfield, N. J., plant by a transfer of the work which has been done there to the company's plant at Hamilton, Ohio. General sales headquarters and the accounting department of the company were also moved to Hamilton for greater economy. Similar contractions of manufacturing facilities on a smaller scale have been undertaken by other companies.

Production Tools in Demand

As in the few preceding years, the demand for high production tools was the outstanding factor in a large share of the 1925 machine tool business. The record-breaking output of automobiles, together with the continued reductions in prices at which automobiles are sold, has been of tremendous importance in creating a market for tools that would do a certain piece of work more quickly and more economically than before. Those machine tool companies which put on the market new or redesigned machines which would accomplish what the automobile industry has constantly been striving for, namely lower costs of manufacturing and assembly, reaped a reward in a substantial volume of business throughout the year. Thus there are some companies which had 12 months of fairly high operation at a good profit, while others had to be content with the moderate demand from other sources.

The year did not bring forth any revolutionary changes in machine design or application, but rather there was an orderly but highly significant development of known principles. Tendencies which have been noted and which were stressed at a meeting of the American Society of Mechanical Engineers early in December may be summarized as follows:

Development of stronger and heavier machines with greater power.

Relieving the operator of tedious hand labor by the use of more power and improving the facility of machine control.

Improvement of lubrication methods such as the application of pressure and splash feed to all bearings and gears, with filters on the return.

Partial elimination of hand-cranking of tables, carriages and slides and the substitution of fast feed movements, controlled by handy levers or push buttons.

Greater application of hopper and magazine feeds on high production machines for light and medium-weight parts.

New lathes with automatic features, and single-pulley drives multiple-feed slides.

Planing machines more frequently provided with power fast traverse, faster cutting and return speeds and better lubrication.

Milling machines in manufacturing types developed to do a wide variety of work.

Drilling machines have become more rigid and of higher speed and sensitiveness. Multiple-spindle drills built for larger production.

Further development of grinding equipment and a wider use of centerless grinders because of the possibilities they offer for unusual production and precision.

Greater use of the precision gage block, the sensitive comparator and light interference apparatus as basis for close measurements, thereby making interchangeable manufacture possible at lower cost.

Such refinements of machine tools have made possible their wider application to many jobs and consequently the makers have profited from a large demand for them. Many of the conspicuously large buying programs of the year originated in the automobile industry, though a number of railroads were purchasers of large lists of tools. In the general industrial field the demand was usually for single machines or small lots, but in the latter part of the year, when orders for metal products of all kinds taxed the capacity and labor facilities of the country, there was a fairly widespread demand for all of the standard tools, so that nearly all machine tool manufacturers ended the year with substantial orders on their books, fairly full shop schedules and a promising volume of pending business to carry them well along into 1926. Better business was reflected in the lengthening of deliveries on many machines, but aside from what some manufacturers called "price adjustments" on their lines, there was no effort at a general advance of selling prices because of the greatly improved market situation.

Large Orders from Automobile Companies

In the automobile industry there were several very large individual purchases and, taking their purchases as a whole, they ran into many millions of dollars. One of the largest single orders was that of the Hudson Motor Car Co., Detroit, for 350 presses totaling in cost about $1,000,000. The Eaton Spring & Axle Co., Cleveland, whose product is largely used in the automobile industry, bought about $500,000 of new equipment.

Foreign automotive interests also purchased large lots of machines, the Fiat Motor Co. of Italy having alone bought several hundred thousand dollars' worth. German automobile plants also adopted American machine tool equipment.

Outstanding among other export purchases were those of the Amtorg Trading Corporation, New York, for shipment to Russia, this company having expended several hundred thousand dollars for American tools and larger amounts for other types of machinery.

One of the largest purchases of cranes in some time was that of Anaconda copper interests for export. The Youngstown Sheet & Tube bought 19 cranes, the Carnegie Steel Co., 13, and the Illinois Central 12.

Barometric figures of the National Machine Tool Builders' Association showed a steady gain in business each month of the year, with the exception of July, when there was a slight falling off from the June rate.

Current Metal Prices

On Small Lots, Delivered from Stocks, New York

THESE prices are given for the convenience of small-lot buyers whose requirements do not run into mill-size orders.

Only base prices can be listed in some cases, due to limits of space; other items of a given group are deducible from the base price.

The prices which are quoted below are those at which small lots may be bought, whether from jobbers' or other stocks.

Complete market reports and prices on large shipments from mills will be found elsewhere under "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.24c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.24c.
Hoops, base price	4.49c.
Bands, base price	3.99c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.34c.
Channels, angles and tees under 3 in. x ¼ in. base	3.24c.
Steel plates, ¼ in. and heavier	3.34c.

Merchant Steel

	Per Lb.
Tire, 1⅛ x ½ in. and larger	3.30c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.65c.
Toe-calk, ½ x ⅝ in. and larger	4.20c.
Cold-rolled strip, soft and quarter hard	6.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds and hex.	4.00c. to 5.00c.
Squares and flats	4.50c. to 5.50c.
Standard tool steel, base price	12.00c.
Extra tool steel	15.00c. to 18.00c.
Special tool steel	20.00c. to 23.00c.
High-speed steel, 18 per cent tungsten	70c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.89c.
No. 12	3.94c.
No. 14	3.99c.
No. 16	4.09c.

3ox Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Long Terne Sheets Per Lb.
Nos. 18 to 20	3.95c. to 4.10c.	5.75c.
Nos. 22 and 24	4.20c. to 4.35c.	5.90c.
No. 26	4.25c. to 4.40c.	6.05c.
No. 28*	4.35c. to 4.50c.	6.35c.
No. 30	4.55c. to 4.70c.	6.85c.

Galvanized

	Per Lb.
No. 14	4.45c. to 4.60c.
No. 16	4.60c. to 4.75c.
Nos. 18 and 20	4.75c. to 4.90c.
Nos. 22 and 24	4.90c. to 5.05c.
No. 26	5.05c. to 5.20c.
No. 28*	5.35c. to 5.50c.
No. 30	5.85c. to 6.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	46	29	⅛ in. Butt	4	+19
¼ in. Butt	51	37	¼ in. Butt	11	+ 9
1-3 in. Butt	53	39	1-1½ in. Butt	14	+ 6
2½-6 in. Lap	48	35	2-in. Lap	5	+14
7 & 8 in. Lap	44	17	3-6 in. Lap	11	+ 6
11 & 12 in. Lap	37	12	7-12 in. Lap	3	+16

Bolts and Screws

Machine bolts, cut thread, 40 and 10 per cent off list
Carriage bolts, cut thread, 30 and 10 per cent off list
Coach screws, 40 and 10 per cent off list
Wood screws, flat head iron,
80, 20, 10 and 5 per cent off list

Steel Wire

Base Price† on No. 9 Gage and Coarser	Per Lb.
Bright, basic	4.25c.
Annealed, soft	4.50c.
Galvanized, annealed	5.15c.
Coppered, basic	5.15c.
Tinned, soft Bessemer	6.15c.

†Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19⅛c. to 20⅛c.
High brass wire	19⅝c. to 20⅝c.
Brass rods	16⅞c. to 17⅞c.
Brass tube, brazed	27⅛c. to 28⅛c.
Brass tube, seamless	23¾c. to 24¾c.
Copper tube, seamless	24¼c. to 25¼c.

Copper Sheets

Sheet copper, hot rolled, 22½c. to 23½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
	Grade "AAA"	Grade "A"		Prime	Seconds
	Charcoal 14x20	Charcoal 14x20	80 lb.	$6.15	$5.90
			90 lb.	6.30	6.05
			100 lb.	6.45	6.20
IC	$11.25	$8.85	IC	6.65	6.40
IX	12.85	10.85	IX	7.85	7.60
IXX	14.40	12.55	IXX	9.00	8.75
IXXX	15.75	13.85	IXXX	10.35	10.10
IXXXX	17.00	15.05	IXXXX	11.35	11.10

Terne Plates

14 x 20

IC—8-lb. coating	$7.75 to $8.00
IC—20-lb. coating	10.25 to 10.50
IC—30-lb. coating	12.00 to 12.50
IC—40-lb. coating	13.65 to 13.75
Fire-door stock	10.50

Tin

Straits, pig	65c. to 65½c.
Bar	69c. to 69½c.

Copper

Lake ingot	15 c.
Electrolytic	14⅜c.
Casting	14⅛c.

Spelter and Sheet Zinc

Western spelter	9¾c. to 10c.
Sheet zinc, No. 9 base, casks	13¼c.; open, 13¾c.

Lead and Solder*

American pig lead	10¼c. to 11¼c.
Bar lead	12¼c. to 13¼c.
Solder, ½ and ½ guaranteed	40c.
No. 1 solder	37c.
Refined solder	30½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	68c. to 72c.
Commercial grade, per lb.	30c. to 35c.

Antimony

Asiatic	26½c. to 27½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), ingots for remelting, per lb. 30½c. to 31c.

Old Metals

Prices continue firm. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.75
Copper, light bottoms	9.50
Brass, heavy	7.25
Brass, light	6.25
Heavy machine composition	9.00
No. 1 yellow brass turnings	8.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	7.75
Lead, tea	6.00
Zinc	5.25
Cast aluminum	20.00
Sheet aluminum	20.00